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ORIGINAL COMMUNICATIONS.

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THE POSTURAL AND NONSURGICAL TREATMENT OF EMPYEMA OF THE ANTRUM. A NOVEL POSTURE.*

DR. SIDNEY L. OLSHO, Philadelphia.

In the treatment of antral empyema, posture is admitted to be only a supplementary measure. Even as such, the general run of text-books attach, in my opinion, inadequate importance to it. I propose to show how it may become an important influence in the treatment.

The rhinologist diagnosing empyema of the antrum, contemplates the surgical aspects of the case even while the examination is under way. As a matter of fact, a slight surgical procedure, viz: the puncture of the nasal wall with either a trocar or with the Lichtwitch needle, is generally conceded to be a justifiable diagnostic procedure.

I do not wish to disagree with the accepted forms of treatment of antral infections, diagnostic puncture, repeated irrigations, made usually with the view of avoiding more radical surgical procedure. The large proportion of successful results thus obtained renders criticism almost impertinent. But untoward effects may accompany even so simple a procedure as antrum punctufe. Numerous patients object to sharp instruments, used for any purpose whatsoever. In an acute case it is difficult to make the puncture absolutely painless. The first time it is done, there is, in almost every patient, an attending nervousness or even some shock. Syncope is not unknown. A certain

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proportion of cases fail to reappear after one treatment and some of these seem to recover without any aid.

Children are not good subjects for repeated irrigation-treatment of antral infections and it is not surprising that for them an early, slight, but effective surgical measure is recommended. The diagnostic puncture presents greater danger in them than in an adult.

Posture for nose-blowing and suction favoring antral evacuation, applicable to children.

In the diagnosis of antral infection, one takes into account the history and symptoms. I shall not dwell upon these familiar things. In the examination, swelling perhaps of the turbinates, the presence of the discharge, the location of the overflow of a filled antrum, each has its familiar significance.

The X-ray is highly useful, but seldom final, in the diagnosis of antrum infection. Frequently we have made our patient comfortable and started him well on the road to recovery before the X-ray report is ready. The X-ray entails some expense, either to the hos-

pital, or to the patient, which occasionally acts as a deterring influence. However, its employment is not to be undervalued.

Transillumination has been useful in my experience, particularly when carried out in a completely darkened room having black walls. I wish to draw attention to an easily constructed effective dark room, described by me in the *Journal* of the American Medical Association, Oct. 8, 1921.

I use the Cameron lamps, which emit an intense white light, and transilluminate the sinuses well in the dark room. I also use routinely, the right angled Cameron dental lamp, by means of which an area of disturbance at, or above the root of any tooth can be almost invariably detected.

I do not care to open up the entire subject of treatment, but desire to touch only upon certain phases of it. In the office treatment I try to get the passages freely opened with weak cocain applications, wash the nose, and then the antrum, if the case be one that requires it. Before irrigating I make slight suction to be certain that the point of the needle is in the antrum. Before again removing the needle, or canula, I expel all fluid from the antrum by air, while the patient is in Escat's position, head held down and opposite ear up.

In the treatment by suction, the use of strong negative pressure is harmful, painful and unnecessary. I do not use a machine and prefer the B. D. Co. one-half ounce asepto urethral syringe, consisting of a glass tube and a rubber ball. The nozzle end fits the nares. The ball is thick and after being compressed to any desired extent, will exert ample pull. If suction is employed for effect on the antrum, one should take advantage of the force of gravity by employing it with the patient in the above mentioned Escat's position. One of the best forms of suction is blowing the nose, and this should be done also while the patient's head is held down, as I will mention again. This position for nose blowing is not to be disregarded, even where irrigations are employed, and is favorable also when permanent drainage into the inferior meatus has been surgically established, as the floor of the antrum is lower than the floor of the nose.

G. F. W., age 44 years, was referred to me Oct. 25, 1924, with catarrhal symptoms, gastric disturbance, and ill health of long standing. His right antrum was filled with evil smelling pus. The infection being of dental origin, the offending tooth was removed. The antrum was irrigated. The cure was rapid. He was discharged Nov. 25, 1924, after the eighth treatment, which included two final negative washings, made after prolonged intervals. The following measures, in my opinion, contributed largely to his speedy recovery:

1. The use at home, with a dropper, of an oil containing: cocain alkaloid gr. ii, camphor gr. i, oil of cinnamon gtt. i, liquid petrolatum f℥ i. Sig: Two or three drops high in the nostril three or four times daily, at the time directed.

2. This patient is in the habit of exercising daily, and while doing so, bends forward on his hips, with the head almost reaching the floor. He is directed to use the oil instillations fifteen minutes before taking these exercises. This oil has a tendency to shrink the turbinates and open the passages. Lowering the head, while exercising, favors evacuation of the antrum.

3. He is directed to place his shoes far under the bed each night, to lie flat on his abdomen on the bed while he is doing so, and while his head is hanging toward the floor, he is directed to blow his nose well. He is directed to instil the oil in his nose about fifteen minutes before carrying out this measure. On awaking he is directed to use a few drops of the oil, and about fifteen minutes later, lying flat on his abdomen, upon his bed, with his head toward the floor, remove his shoes from under the bed. He is to blow his nose well while his head is down in this position. The manipulation of his shoes is merely to remind the patient of what he is to do and to give him his position (or stance).

If one's patient happens to be a gymnasium habitue, I would suggest that he would be benefitted by hanging by his knees on a bar, and blowing his nose as his head is suspended. As a matter of fact, I think that such a person is not likely to have antrum infection of long standing.

I. S., boy, age 5 years. First seen by me March, 1924, said to have had a tonsil and adenoid operation, May, 1923, which was recommended because the patient had a constant thick, greenish discharge from his nose. The discharge continued unabated after the operation. He also had ear trouble, which was treated by a pediatrician. The family and personal history is otherwise good.

The boy is well nourished and well developed. The tonsils and adenoids have been skillfully removed. A few cavities are seen in the teeth in both upper quadrants. Both ears show healed membranes.

The nasal passages contain considerable greenish discharge. The septum is deviated to the right, high up, and well to the left low down. Suspicion is directed to the antra, and transillumination shows these to be dark. The sinuses were X-rayed by Dr. Willis F. Manges. He reports considerable cloudiness of both maxillary antra, as well as a slight involvement of the ethmoid cells; a very small

frontal sinus on the left side and no frontal sinus on the right side; probably some free exudate in both maxillary antra and in the right ethmoids. The sphenoids are clear.

In view of the fact that this boy's health seems not to be unfavorably affected by his nasal condition; of the fact that an antral infection in a child is most likely of the acute type, *i. e.*, without serious mucous membrane disease; of the fact that the mother preferred to have no surgical measures performed, and of the fact that a small boy is not a favorable subject, not even a diagnostic puncture was made. The conservative measures presently to be described, were carried out experimentally, but with complete success. Office treatments, every three or four days, consisted simply of shrinking the turbinates, followed by a very slight irrigation of the nose. After a lapse of fifteen minutes the patient was held by his feet, with his head downward, as shown in the illustration, and asked, while in this position, to blow his nose well. Suction was also applied by means of the urethral syringe, with patient in the same position. Subsequently, the nose was, if indicated, again slightly irrigated with warm saline solution, and the treatment finished with an oil nebulization.

The home treatment was similar. The oil was instilled in the nose and one of the parents held the boy, feet up, head down, as shown in the illustration, and the patient was asked to blow his nose very well. This was carried out two or three times daily. The boy entered into the spirit of the thing and considered it play. While the treatment extended over a period of about three months, the intervals between later office treatments became very much longer than at first, for improvement was marked after a short time. The later visits were, more or less, observations and transilluminations. The patient was finally discharged as the transilluminations were persistently negative and all nasal discharge had disappeared. The postural measures at home were continued uninterruptedly throughout the course of his treatment.

While I have, so far, treated only this one undoubted case, without recourse to even a diagnostic puncture, the measures seem to me so rational, that I want to submit them for general consideration.

The general plan of postural treatment is applicable to all cases, acute or chronic, surgical or nonsurgical. It is submitted as a harmless, efficacious *supplementary* course of maneuvers to be carried out, both in the office, and, in the intervals between treatments, at home.

235 South 15th Street.

UNUSUAL ACCIDENT IN AN ANTRUM OPERATION.*

DR. PHILIP C. MEANS, Santa Barbara, Calif.

A young man recently came to me with an antrum infection which he was first aware of following the extraction of a diseased tooth. After irrigations and the healing of the alveolar opening it seemed cured. Two weeks later he returned complainng of foul discharge from the nose, especially when lying under a car in his work as an auto mechanic. It seemed best to make a wide opening under the lower turbinate and treat it thoroughly. This was done, enlarging it with rasp and punch. Blood and mucopus was washed away with a syringe and curved silver canula, using normal salt solution. The inside of the antrum was not curetted.

When the draping was removed the eye on that side was closed by extensive edema of the lids and orbital tissues, much as we sometimes see in an orbital cellulitis from breaking through of extensive sinus disease. This swelling subsided rapidly and in an hour was mostly gone. Slight ecchymosis remained about the inner canthus and over the area of the lachrymal sac. Though I fully expected infection of the orbit and the formation of an abscess nothing developed. The antrum was easily treated and was promptly cured.

I can only explain this happening by supposing that the rasp detached the tissues up under the nasolachrymal duct and that the irrigating fluid, even without much pressure, but obstructed by clots, followed the duct to the orbit. It shows what unexpected things may happen in nasal surgery. Fortunately the patient took it placidly and asked no questions. I have never heard of a similar case.

402 San Marco Building.

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*From the clinic of the Santa Barbara Cottage Hospital.

AMERICAN BOARD OF OTOLARYNGOLOGY.

The next examination conducted by the American Board of Otolaryngology will be held at the Ambassador Hotel, Atlantic City, on Tuesday, May 26th, at 9 A. M.

Application blanks may be obtained from Dr. H. W. Loeb, Secretary, 1402 South Grand boulevard, St. Louis, Missouri.

MINUTAE OF SURGICAL TECHNIQUE OF SIMPLE MASTOIDECTOMY.*

DR. JACOB L. MAYBAUM, New York.

In complying with our Chairman's request to participate in this evening's program, "Symposium on Minutae of Surgical Technique", I was reluctant at first to appear before a group of trained otologists to present the subject of simple mastoidectomy. Considering, however, the frequency with which the simple mastoid operation is done, far more frequently than any of the others to be described tonight, the diversity of operative procedure among different operators, and the necessity at all times for a careful, painstaking technique, there is some justification for presenting the subject. I take it, further, that the prime purpose of this symposium is not only to present the views of the readers of the various papers, but to bring out in the discussion the experiences of others regarding operative procedures and the reason for regarding their particular technique adequate for their needs.

The ideal mastoid operation should have as requisites safety, thoroughness and a due regard for the question of rapidity. There are undoubtedly many methods of exenterating the mastoid. The ideal operation is not by any means in the hands of any group of men, for it can be performed with safety and thoroughness in more ways than one.

The technique which I use was taught to me by Dr. Friesner ten years ago. Some time previously I had learned a quite different procedure in various Berlin and Vienna Clinics. During the past seven years I have taught the technique with Dr. Friesner to many men. There has been no necessity for changing the technique as it conforms to the essentials mentioned above—it is safe, thorough, and can be expeditiously done.

First as to the question of safety. One of the important necessities for acquiring a safe technique is a systematic plan of exenterating the mastoid cells. Purely for technical purposes, Dr. Friesner has divided the mastoid cells into four groups. To safely exenterate the mastoid it is necessary not only to know what to do and how to do it, but to know what to do next. These essential procedures are accomplished in a large measure by a definite system of attacking the various groups of cells. These groups will be referred to later.

*Presented at the Section on Otology, New York Academy of Medicine, Oct. 10, 1924.

Another point conducive to a safe technique is the use of proper instruments and the proper use of these instruments. Most of the men present this evening are familiar with the instruments used.

The gouge which Dr. Friesner has modified is safe because it has a somewhat larger shoulder than usual, thus shoving away any important structure dura or sinus which may be exposed without inflicting any injury. In exenterating the cells it is essential to use the curettes parallel to any important underlying structure, *i. e.*, the dura, sinus or facial nerve. The larger the instrument used the safer. At no time should one permit the gouge to become bound. Overhanging areas of bone are removed before proceeding further. The operative field should be free from blood and bone chips.

An incision is made one-half inch below the tip, one-quarter inch behind and parallel to the auricular attachment and ending at the upper pole of the attachment of the concha. The incision is carried to the bone at one stroke so as to avoid tearing the periosteum during the next step. The periosteum and soft parts are retracted so that the posterior and superior canal walls are in plain view and the tip is completely uncovered. The membranous canal should not be separated from the bony. We have discontinued the use of the self-retaining retractor as separation of the membranous canal is more likely to occur than from the use of a hand retractor.

The spine of Henle is not used by us as a guide to locating the antrum as it is at best variable in size. Using the above-mentioned gouge, a strip of cortex parallel to the posterior canal is removed, beginning above on a horizontal line tangent to the roof of the bony meatus and extending the groove downward to the tip as close as possible to the posterior canal wall. The groove is deepened with a scraping motion from below upwards, using a Spratt curette.

With a large bulldog ronguer, commencing near the tip, the cortex is removed over the entire field of operation. The removal of cortex is begun near the tip because the sinus here is placed deeper. The initial groove (the cells of which are designated Group I) is again deepened, thus opening into the antrum. The opening into the antrum is further enlarged by cutting with the side of a Spratt curette with a boring motion, commencing with the cutting edge of the curette directed upwards, rotating anteriorly and then downwards along the posterior canal wall.

The next step is to remove the cells covering the floor of the middle fossa (Group II). These are uncovered with a fairly large Spratt curette working parallel to the floor of the middle fossa; a Richard's curette may be used here, making long sweeps. All over-

hang is removed with curette and ronguer, special attention being given to the outer antral wall, postantral cells and groove between the floor of the middle fossa and posterior fossa. The initial groove is further deepened, using the upper edge of the bony wound as a fulcrum. The upper and outer aditus walls are enlarged. At this stage of the operation the zygoma cells may be cleaned out. We do not find it necessary to use a probe to locate the antrum as the horizontal canal is a definite guide.

We are now ready to clean out the third group of cells, *i. e.*, those in front of, external to and behind the sigmoid sinus. These cells are removed with a large Richards curette making long strokes paralleling the sinus, beginning at the lower end of the sinus groove. After all cells are removed and inner table is in evidence throughout, all "overhang" and pockets obliterated, the tip is removed with a large curved ronguer, beginning behind and following the digastric muscle. The tip is last to be removed. The fourth and last group of cells—usually of small extent and not always present, are located between the sinus and bulb and internal to the facial nerve. This group is best cleaned out after removing the tip. The reason for removing the tip almost as a last step after the cells of the mastoid proper have been exenterated is to avoid carrying infection into the soft parts of the neck.

The posterior canal wall is now trimmed and rounded off with a small ronguer forceps, care being exercised not to separate the membranous canal with the ronguer. All bony edges are now smoothed by means of a large Richard's.

Suturing: If the inner plate is hard, white and intact we suture almost to the lower end—within one-half inch. If we have reason to believe that we are dealing with a Pneumococcus type III infection, we allow for ample draining by leaving the wound fairly well open. Mastoid cavity is packed with iodoform gauze; this is removed on fourth or fifth day. A rubber tissue drain is carried to the antrum and changed every other day. Under ordinary circumstances the middle ear should be dry in about two weeks; as soon as the middle ear is dry the mastoid drain is discontinued. If we are dealing with a mucosus infection the wound is drained for a longer period even though the middle ear is dry. We do not use antiseptics or irrigation to cleanse the mastoid wound. A number of dry applicators are inserted to the antrum to remove discharge.

The technique of a simple mastoidectomy has been taught to a few hundred men throughout the country and has proved to be highly satisfactory.

12 East 86th Street.

SOME REMARKS ON THE TECHNIQUE OF THE MODIFIED RADICAL MASTOID OPERATION.*

DR. JOHN RANDOLPH PAGE, New York.

Those who have developed to their satisfaction a technique for the radical mastoid operation will, with a few modifications, follow the same method in the modified radical for, as Bondy says of this operation. "The resulting cavity, except as regards the presence of the drum membrane and ossicles, has the same relationship as after the typical radical operation". As variations in the technique occur with the different types of cases encountered I may be permitted to mention here a part of the working plan used in our clinic in operating on certain types of subacute and chronic otorrhea.

Except in the obvious cases where no less than the radical is manifestly indicated, we are inclined to enter the mastoid with the intention of performing the radical only if we are led to do so by the degree of involvement found. The following suggestions were submitted to the Clinic last February:

1—Cases in which the acute signs of mastoiditis have subsided but in which discharge continues through a pouting or widening perforation.

Operation: Exenterate the mastoid to prevent deafness and chronic otorrhea.

2—In similar cases in which there is also inflammatory atresia of the canal that might later interfere with access to the drum.

Operation: Exenterate the mastoid and lower the posterior wall to the annulus and construct a new meatus with closure of the posterior wound.

3—Cases which have continuous or intermittent discharge through perforations that show no tendency to heal despite attention to the nose and throat, cleansing treatment, etc.

Operation: Exenterate the mastoid and lower the posterior wall to the annulus, widening the aditus according to the condition found, and construct a new meatus.

4—In cases where there is a varying amount of drum membrane left and sufficient hearing to warrant an attempt to preserve or improve it.

Operation: Same as No. 3 with further widening of the aditus and removal of the external attic wall and, depending on the degree of

*Presented at the Section on Otology, New York Academy of Medicine, Oct. 10, 1924.

the involvement of the attic and tympanum, removal of the epitympanic bridge, etc. Even in cases where there has been great destruction of the drum membrane and marked changes in the tympanum, *provided danger to the patient can be eliminated,* let the conservative operation be tried, and time be allowed for regeneration of the drum membrane or the formation of cicatricial membranes to wall off the tube and effect a dry tympanum.

If, after fair trial, otorrhea still persists due obviously from its salivary and mucoid character, to tubal communication with the nasopharynx, the Yankauer operation for closure of the tube may be tried according to the technique described by its author.

5—Finally, in those cases that have been unsuccessfully treated by such conservative methods, and those that are found at operation to warrant it, perform the radical operation with complete exenteration of the mastoid and special widening of the tympanum to facilitate after-treatment and keep the tubal region well in view.

The operation suggested for the subacute cases with inflammatory atresia of the canal (and this includes not a few recurrent mastoids) may be regarded as a modified radical justified for the reason that the simpler operation leaves the atresia uncorrected. In such cases the technique differs from that employed in cases with greater involvement of the tympanum. After complete exenteration of the mastoid the membranous canal is separated from the posterior bony canal wall and the latter is lowered almost to the level of the horizontal semicircular canal. The membranous canal may then be distended by a strip of gauze passed through the external auditory meatus down to the drum membrane itself. This facilitates incision of it and when the gauze is grasped and drawn through the incisions it reflects the edges next the drum membrane over the facial ridge. Some care in this procedure will prevent an awkward complication from inversion of the canal lining towards the drum membrane and subsequent narrowing in that region. The transverse incision in the distended canal should be 10 m.m., if possible, above the level of the lowered posterior wall. Incisions may then be carried in its long axis to the level of the lowered bony wall and the flap reflected over the facial ridge, where it will adhere and not invert with packing towards the drum. All of the membranous canal external to the transverse incision may then be excised, and there remains to be made only the semicircular incision in the concha to enlarge the meatus.

In such cases it is well not to reflect an epithelial flap as in the radical operation, for a large cavity in the mastoid lined with epi-

thelium tends to collect exfoliated debris. It is better, therefore, to encourage the growth of healthy granulations in the cavity and have it cicatrize and shrink as much as possible.

In cases with greater involvement of the tympanum I am inclined, like Blackwell and Bondy, to remove the external lateral wall of the attic and the bridge as completely as possible for by so doing one is better able to determine the condition of the ossicles and decide whether or not the more conservative procedure is justified, or whether the radical had better be performed. Like Bondy, we have found that support of the drum membrane in the region of the Rivinian fissure is not materially interfered with by removal of the lateral wall of the attic.

Except in cases that have been operated on previously the initial incision that seems to give the least noticeable scar or depression is like a question mark and begins at the tip, not below the attached border of the auricle, and curves sharply backward to the hair line and then upward to be carried well forward to allow retraction forward and clear access to the attic region. Preservation of the canal lining near the drum membrane is important, and even a remnant in this region is worth saving. Quicker dermatization over the lowered posterior wall is obtained from even a small fragment of epithelium near the drum than from larger flaps laid back from the more external portion of the canal, and concha. As in the radical, a narrow bony canal should be widened even after its posterior wall is lowered to give proper access to the tympanic region. The excision of the outer portion of the membranous canal and the thick tissues above and behind it leaves a good view of the whole cavity obtainable through a meatus in the concha of even moderate size, and except for a precautionary drain that may be left for a day or two at the lower angle of the closed posterior incision all after-treatment takes places through the meatus.

The wick at the lower angle of the incision may be removed with the outer dressing on the following day. A full dressing is done on my cases not later than the third day and sometimes on the second full day after operation. The gauze is usually removed under gas anesthesia even to the small piece of vaseline gauze that is placed next the drum to hold the fragment of lining in place over the lowered wall, and before the patient is out of gas the cavity is filled with 10 per cent cocain in boric acid solution so that by the time consciousness is completely restored the cocain can be washed out and a comparatively painless dressing performed. With closure of the posterior wound a retention cavity is formed in the lower part of the

mastoid from which secretion will not drain readily through the meatus. For this reason it is well to keep gauze loosely packed through the meatus into that part of the cavity to absorb the secretion until some shrinkage has occurred and danger of inflammation in the neck muscles has passed. Were it not for this, all packing could be removed after the first dressing and the cavity irrigated every two hours with Dakin's or Zonite solution. My experience has been that it is safer to fill the entire cavity with gauze every day for the first ten days or two weeks before beginning irrigations, although I have obtained some quick results by beginning irrigations of the empty cavity on the third or fourth day. When cholesteatoma has been removed from the attic daily applications of 1 or 2 per cent mercurochrome solution in addition to the frequent irrigations with Zonite seem to have been of value.

127 East 62nd Street.

CHOKED DISC OCCURRING IN MASTOIDITIS WITH EXTRADURAL ABSCESS. CASE REPORT.

DR. SIMON JESBERG, Los Angeles.

K. B., male, age 7 years; first seen June 5, 1924. Complaint: swelling behind left ear and discharging ear. The ear condition began about Apr. 20, 1924, during measles. Three days after beginning of earache there was spontaneous rupture of the drum; the ear has been discharging since; there has been no particular fever nor any chills. About one week ago swelling began behind the left mastoid region with tenderness and slight redness.

Past history: Patient's health always been good. Last year had whooping cough; tonsil and adenoid operation in 1922. No previous ear complaint.

The examination shows a poor nourished, well developed male of seven years. Temperature 99,° pulse 120, respiration 28. The head examination shows no pathology except the left ear and mastoid. The tonsils and adenoids have been well removed; the nose and sinuses are clear.

The left ear: Thin, odorless pus in the canal. M. T., dusky red and swollen; all landmarks are obliterated. No definite perforation

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is seen, although pus appears in the posterior-inferior quadrant. There is slight edema of the posterior canal wall. About 4 c.m. behind the left pinna there is a slight swelling, with tenderness. The mastoid, itself, is not swollen or tender.

General examination: Head, lungs, and abdomen are normal. Urine normal.

Eyes: Normal externally; pupils are equal and react normally; media clear. *The edges of papilla are almost entirely obliterated in the right eye, in the left eye the obliteration is complete with a swelling of the disc of three diopters.* Vision is 20/20 in each eye; the fields are contracted.

General neurologic examination showed no abnormality; no cervical rigidity; no Kernig; no Babinski; special tests for sensory aphasia and cerebellar lesion showed no abnormality. Diadokokinesis is not present.

Simple mastoidectomy was done on June 5, 1924. A T-incision carried back over the posterior fossa; cortex removed, showed an extraduralabscess under the knee of the sinus in the posterior fossa. In other words, an extra cerebellar abscess. The sinus was covered with granulations and contained liquid blood (as demonstrated by aspiration). There was no evidence of the extension of the abscess through the dura. All mastoid cells were cleaned out and sinuses and posterior fossa uncovered. The wound was closed, except space below for 1½ c.m. long, through which drains were inserted through the antrum and the abscess cavity. Convalescence was uneventful. Rise of temperature to 103° a day after the operation, which became normal by the third day and remains so. Repeated examinations showed no indication of intracranial involvement.

Coordination tests, and sensory aphasia tests were particularly tried. The swelling in the discs gradually became less. The vision remained 20/20 in each eye with no abnormality demonstrable in the fields. By July 7, 1924, the wound was completely healed and the M. T. normal, except for scarring. On July 3 he reacted normally to the Vestibular tests.

By Aug. 13, papillae are fairly well outlined; no swelling; vision 20/20 in each eye; hearing is apparently normal; the mastoid wound is still completely healed. The patient is perfectly well, with no abnormal symptoms. Patient has been heard from at monthly intervals, and condition is still normal.

I am reporting this case because of the occurrence of papilledema as a symptom of extradural abscess, with no other symptoms being present indicative of intracranial disease.

1151 West Sixth Street.

CONTRAINDICATIONS TO SURGERY IN ACUTE MASTOIDITIS.

Dr. M. S. Ittelson, Brooklyn.

Cases of acute mastoiditis can be divided for convenience into two classes. The first class includes those cases which are characterized by a marked congestion of the mucous membrane lining the mastoid cells. This mucous membrane is a continuation of that lining the middle ear, and is usually affected whenever the tympanic mucosa is acutely inflamed. In acute purulent otitis media the congestion is mild and transitory; in acute mastoiditis it is severe and more lasting. The second class comprises those cases of acute mastoiditis which are characterized by abscess formation. In these, during the course of the disease, the inflammatory process sometimes extends from the mucous membrane to the bony partitions, causing them to soften and to break down. As a result of this process an abscess is formed which may contain either pus or broken down semisolid necrotic tissue; or, as is more frequently the case, both pus and necrotic débris. Abscess formation is not likely to occur until at least one week has elapsed from the onset of the mastoid symptoms. This period varies, however with the nature of the infection, the type of the causative organisms, and the anatomical structure of the mastoid bone.

In the presence of an abscess a mastoid operation is definitely indicated. It is, however, usually desirable to avoid or to delay surgical intervention when a congestion of the mucous membrane alone is present, since in this condition a mastoid operation may not be needed. Indeed, it is not unusual for a patient to recover without an operation even when the congestion is severe and the mastoid symptoms are prominent. Another advantage incident to such a delay is that suppurative changes may occur in the course of the disease, and there are reasons why it is preferable to defer operation until the bone is soft rather than to attempt operation while the bone is still hard. When an abscess is present it is a comparatively simple matter to uncap the cortex and open the cells. When there is no abscess a mastoid operation requires the removal of the entire infected area—a much more extensive procedure and one which subjects the patient to an added risk. On the other hand, in the presence of an abscess the inflammatory process is usually localized and walled off, and with the advent of drainage, rapid recovery is the rule. When there

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is no abscess formation the inflammatory process is frequently in the active stages, and if operation is performed at this time the cells which are left behind (and some cells are always left behind) later can and sometimes do become infected, healing is delayed, and a secondary operation may be necessary.

The question arises, whether the delay of a mastoid operation until suppuration has developed is not dangerous to the patient. In a small proportion of the cases of acute mastoiditis it must be admitted that there may be some risk incident to such a delay. Since, in fulminating mastoid infections, intracranial complications can occur at any stage of the disease, a mastoid operation before suppuration develops —as a preventive measure—is regarded by some physicians as a highly effective measure. In nonfulminating mastoid infections (and the great majority of the cases of acute mastoiditis are nonfulminating) intracranial complications are not likely to occur before suppuration develops. The danger therefore is very slight if in this type of acute mastoiditis surgical intervention is postponed until conditions favorable for operation have developed.

As a matter of fact, in practice, a mastoid operation is usually performed only when there is reason to suspect the presence of pus. The symptoms which induce the surgeon to operate—persistent pain and tenderness, sagging of the superior auditory canal wall, profuse discharge, and suggestive blood and X-ray findings—are in the last analysis all signs indicating an accumulation of pus. The value of these symptoms depends on how reliable they are as evidences of a suppurative process. There is a growing tendency to minimize the importance of such symptoms which have been found to be of no significance in this respect. For this reason early pain and tenderness as an indication for operation are usually ignored, and a high temperature has lost much of its former significance. Operations are often performed unnecessarily where there is no pus, due to the fact that the prominent symptoms are sometimes misleading. A physician is thus actuated to operate because he suspects pus and fears its presence. Although such errors are sometimes unavoidable, and an exploratory operation may be justifiable, the fact remains that if the absence of suppuration could have been definitely determined beforehand many patients might have been spared the anxiety and suffering incident to surgical intervention.

In nonfulminating mastoid infections the decision to operate therefore hinges on the question as to whether or not pus is present in the mastoid bone. Frequently this information can easily be ascertained. A subperiosteal or a Bezold abscess gives positive evidence

that there is pus in the mastoid bone. The classical symptoms of mastoiditis, if they are present and if they continue over a sufficient length of time, furnish fairly reliable evidence of suppuration. There are, however, many cases of acute mastoiditis in which a diagnosis of suppuration is difficult. In children, in the absence of a cortical swelling, it is always difficult to determine the presence of mastoid suppuration because pain and tenderness are hard to recognize, sagging of the superior canal wall, unless marked, is difficult to make out, and furthermore in a very young child there is no bony canal wall to sag. In the adult, mastoid suppuration is often difficult to diagnose when certain of the symptoms of suppuration are lacking, as is frequently the case. An early diagnosis is particularly difficult owing to the fact that the duration of the symptoms is equally as important as their presence. All the symptoms combined, during the first week of the disease, have less diagnostic significance than can be attributed to any one symptom—such as pain and tenderness, profuse discharge, diminished hearing, or changes in the fundus—which has persisted after three weeks. By the end of this period a diagnosis of mastoid suppuration can often be made by the patient, while in the first week of the disease, the making of such diagnosis is frequently difficult even for the otologist.

The treatment of these doubtful cases is therefore a serious problem. A physician is naturally reluctant to delay an operation when pus is present. On the other hand, because a mastoid operation may not be needed, or because a premature operation is otherwise undesirable, he is, and should be, equally reluctant to advise an operation in the absence of pus. If err he must, how shall he err on the side of safety? It is important to take cognizance of the dangers that are likely to ensue when a needed operation is delayed. It is equally important to take into consideration the dangers that are likely to arise when a needless, or a precipitate operation is performed. It is also important to compare the likelihood with which serious complications may occur under both circumstances. In nonfulminating mastoid infections, where the diagnosis of suppuration is in doubt, the decision as to the advisability of operation depends largely on the results of this comparison.

It is, of course, an accepted principle in medicine that pus anywhere in the body must be evacuated; but the rapidity with which this should be done varies under different conditions. For example, an abscess situated near the larynx may, because of its anatomical relation, induce suffocation; such an abscess demands immediate drainage. An abscess in the region of the appendix may rupture and thus

cause peritonitis; an abscess of this kind also must be drained immediately. But a boil on the neck, an alveolar abscess, or a collection of pus in a cervical gland, or in the breast, does not present the same urgent reasons for immediate drainage. Under conditions of this kind the fever may keep up, the patient may be ill, recovery may be delayed; but fatal, or even serious, results, just because an operation has been deferred, are rare. Many fatalities attributed to a delay in operating are really due to other causes. An investigation of such fatalities will show, as a rule, that, either because the infection was unusually virulent or because the patient had some constitutional disturbance, or for some other reasons, the outcome in all probability would have been the same even though an earlier operation had been performed. Thus we may say that while in some parts of the body pus must be drained immediately, in other localities drainage is less urgent. There is abundant evidence to show that the mastoid bone is one of those regions of the body where the immediate evacuation of purulent contents is not imperative.

Although an abscess in the mastoid bone is anatomically close to the labyrinth, brain, dura and sinus, the involvement of these structures, owing to any reasonable delay in operating, occurs very infrequently. The number of cases of acute mastoiditis in which an operation is delayed, and in which pus is allowed to remain for a varied period of time, must be enormous if one judges from the number of subperiosteal abscesses that are seen daily and from the large pus cavities found at operation; yet the serious results that would be expected to occur frequently because of such retention of pus are rarely reported and in fact they rarely develop. Although the tendency of pus is to work outward, it sometimes burrows inward, when the thin inner plate of bone is broken down, and reaches the dura or the sinus covering. In spite of this, under the usual circumstances both of these structures are able, at least for a time, to resist such an invasion. In acute mastoiditis, perisinus and epidural abscesses recover after an operation just as readily as in the cases of acute mastoiditis which are operated on earlier in the course of the disease, before this condition develops. The fact that serious complications sometimes occur if pus is present and operation is postponed does not necessarily mean that they are due to lack of mastoid drainage, for intracranial complications frequently occur after early mastoid operations. It is thus evident that in many cases of mastoiditis intracranial complications may be traced to causes other than lack of mastoid drainage—causes which are not removed by early surgery. Many physicians are now inclined to feel that a reasonable retention

of pus in the early stages of the disease is not harmful, or rather that such retention does not decrease the chances for the patient's recovery. Mastoid operations are now rarely performed during the first few days of the disease. Over 90 per cent of surgical mastoids are operated upon only after a period of at least one to five weeks has elapsed from the onset of mastoid symptoms.

In discussing the question whether we should operate early or treat acute mastoiditis expectantly, Politzer[1] writes as follows: "The experience of the last few years has taught the author that in many cases the too early opening of the mastoid process—that is, on the fourth or fifth day—has an unfavorable effect on the course of the disease and on the process of healing. One finds especially in those mastoids composed of small cells, which are opened during the first eight days of the disease, several disseminated collections of pus spreading in all directions, instead of one abscess cavity. In such cases the wound heals badly—in fact, much worse than if one abscess cavity were found—as it is seldom possible to remove all the diseased bone-substance. Pneumatic mastoid processes form an exception to this rule; if one operates on these mastoids one finds an extensive abscess even if the disease has existed but a few days. As a rule, the author rarely operates before the eighth day of the disease and thinks one should operate during the first few days of the disease only under two conditions: *1*, when a swelling appears over the mastoid process during the first few days of the disease; *2*, when, without the appearance of such a swelling, rigors and symptoms of meningeal irritation appear—that is, perisinus or epitympanic abscess has developed."

Yerger[2] in considering the indications for mastoid operations says "the acute mastoid cases in which operation is not indicated are the cases without bone destruction or abscess formation, and those not having developed symptoms of serious complications. In these cases watchful conservative treatment for a period of three weeks should be established, for, as Norval Pierce states: 'It requires three weeks for decalcification to occur in the osseous structure of the pneumatic cells and in the absence of obvious complications, unless the intercellular bony trabeculae are broken down, a mastoid operation is not indicated.' . . .

"Bezoldt and Siebenmann state that a mastoid operation is scarcely ever indicated before the eighth to the fourteenth day. Politzer rarely operates before the eighth day, and Schwartze rarely ever operates unless the mastoid symptoms continue eight days after the free drainage of the middle ear has been established. That too many

mastoid operations are performed unnecessarily is a well established fact, as witnessed in many cases of acute suppurative otitis media which have been operated on during the first week on account of tenderness over the mastoid fossa."

Another authority who takes a position similar to the one we are upholding is Francis P. Emerson,[8] who writes as follows: "With an acute middle ear and mastoid involvement it may be said that operation is the safer alternative. In order, however, to obtain an early dry middle ear and good hearing it is necessary to choose a time for the operation when the bone abscess has commenced to be walled off by a leucocytic barrier, that is, has commenced to limit itself so that the involved area is definitely outlined and the infection has commenced to subside. . . . We must remember that in all cases of virulent middle ear infection the mastoid is involved, and to operate in the congestive stage means a prolonged middle ear discharge and the danger that deeply placed cells may break down later. This is particularly true if the operation is done when the resistance of the patient is low, as is the case when mastoiditis complicates an infectious disease."

Again, even in the nonfulminating mastoid infections, to have recourse to surgery before pus has formed may not be a safe procedure. Such operations are not infrequently responsible for complications that are sometimes attributed to the disease. Originally, when a mastoid operation was performed only on healthy bones with the hopes of relieving deafness, fatalities occurred so often that for a time the operation was legally prohibited. Notwithstanding the improvement in the technic and the advent of asepsis, if the modern simple and complete mastoid operation were today performed on normal bones a certain number of fatalities would follow. The operative mortality and morbidity is naturally much higher when such an operation is performed on bones which are acutely inflamed, unless the inflammatory process has become localized and walled off, and an immunity to the disease has developed. In certain parts of the body an operation in the acute or the hyperemic stage of the infection is particularly dangerous. It is now generally recognized that an early curettage of a septic uterus may cause septicemia, than an operation in acute salpingitis is frequently followed by peritonitis, and that to curet the ethmoid cells in acute sinusitis is to expose the patient to the danger of meningitis. Similarly in acute mastoiditis, to have recourse to surgery before pus has formed may invite complications which otherwise might not have occurred, either by opening up new avenues for the spread of the infection or by disturbing the balance which

may be maintained in the body between its protective and destructive forces. Early operation has been mentioned as being one of the reasons why some surgeons repeatedly encounter so many more cases of post operative sinus thrombosis and other complications than do other surgeons with an equally large number of similar cases.

Furthermore, under certain circumstances it may be desirable to delay an operation even though pus is present in the mastoid bone. Recently, S. T. Sorensen[4] reported a series of cases of suppurative processes in the mastoid, having their origin in scarlatinal otitis. Of this series 57 patients with acute mastoiditis, in whom operation was delayed until subperiosteal abscesses developed, recovered completely after a simple incision of the abscess. Three patients with acute mastoiditis, in whom the usual mastoid operation was performed early in the disease, died. This author's experience is that pneumonia, uremia, and other evil results are liable to follow any extensive mastoid surgery during the active or convalescent period of scarlet fever. This report deserves serious consideration because of the possibility that similar serious results from early and extensive surgery may occur more frequently than is usually supposed, not only in scarlet fever but in other conditions as well. When a patient is weakened by disease it is sometimes desirable to delay an operation until the diffuse collections of pus have had time to coalesce into one abscess, and until that abscess has enlarged and has approached nearer the periosteum. An earlier and of necessity a more extensive operation in such a patient may be the feather's weight that can tip the scales against recovery.

Of course it must be admitted that under ordinary circumstances, this deliberate retention of pus should not be permitted. The sooner drainage is instituted, the sooner will the patient get well. But in the effort to secure prompt drainage it is important to avoid operating in the absence of pus, inasmuch as such operations are frequently needless and are not without danger. In nonfulminating mastoid infections, where the presence of pus is merely suspected, surgical intervention frequently can be delayed with safety until this suspicion is confirmed.

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ACUTE MASTOIDITIS CAUSED BY STREPTOCOCCI (HEMOLYTICUS AND NONHEMOLYTICUS) ASSOCIATED AT TIMES WITH PNEUMOCOCCI.*

DR. PHILIP S. STOUT, Philadelphia.

A plea for early operation.

Comparisons with appendicitis.

Hippocrates (460-387 B.C.), quotation from Dr. St. John Roosa, "Describes pain in the ear connected with high fever as a very dangerous disease and he stated that if neither pus escaped from the ear nor blood from the nose the death of the patient usually occurred from the ninth to the eleventh day"—and he further stated that he noticed that acute aural disease sometimes led to fatal results on the third day after its occurrence.

Undoubtedly he was observing what we now know as streptococcic and possibly pneumococcic mastoiditis, and notice how observing he was in regard to the length of time they were ill before they died, nine to eleven days, or others only three days. He naturally was shocked and wrote it so that others might read and be on their guard for a similar circumstance. This was over two thousand years ago and yet the same mistake of waiting too long is made today as it was then.

Since that time we have learned how a mastoid bone can be opened, cleaned, and drained with but little danger, not nearly as much as an operation for appendicitis, and if it is done early enough the mortality in all cases is quite low; while if not done in time, after the sinus and meninges are seriously involved, the mortality is almost 100 per cent if the organisms are streptococci, pneumococci, or both. Often times we see patients come into the hospital who have had mastoid trouble for one, two or three weeks, and sometimes are even treated in the hospital for one, two or even three weeks before operation on the mastoid is advised—and in one case:

Ruth F., age 2 years. This case occurred about ten years ago. This child had been taken to the hospital with mastoiditis. This was a very typical case. She was there three weeks and was sent home as cured and she died within ten days with what appeared to be a general septicemia and some intracranial complications.

Again, another patient: a very recent case.

R. W., age 16 years, was in the hospital about one week, with mastoiditis, was allowed to go home, had a chill and the next day

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returned to the hospital when an immediate operation was performed, but in five days it was a fatal outcome. Pneumococci infection. He died fourteen days from the time he first entered the hospital.

Both these cases were under trained otologists. Is there then any wonder that this occurs to the general practioner? The question arises, can anything be done to overcome this continual fatality? Can we foresee the danger and govern ourselves accordingly? The Mayos say that what we can foretell we can avoid, and for that reason this paper was written.

I have had this paper in mind for a number of years. In 1919 I spoke to a prominent otologist in this city relative to the course of mastoiditis and I said there was some resemblance to appendicitis. He said he had mentioned that fact in one of his earlier papers. It had occurred to him that there was some analogous conditions and I shall use this to drive home the facts I desire to enumerate.

Before the days of McBurney and Murphy, the two Prices, the two Deavers, the two Mayos, and others, appendicitis was looked upon just as mastoiditis is looked upon at the present time by most physicians and the mortality was about 15 per cent—that is, 85 per cent got well without operation and 15 per cent died, or operation was deferred and done only as a last resort. But these surgeons came along and showed that early operation properly done will save about 99 per cent. They had a hard road to travel. There were two camps, the conservatives who waited, and the radicals who operated. Needless for me to say that slowly but nevertheless surely the so-called radicals won, and the lesson of appendicitis has been so thoroughly driven home by the advocates of early operation that it takes a mighty brave physician to advise "watchful waiting" when he has made his diagnosis of appendicitis and has advised the near relatives or the patient what his diagnosis is. They tell him very quickly what they have learned through the various avenues from which the general public get their medical knowledge. There must be a very good reason given if he desires to delay the operation for even a day or two. This has been purely educational and is fixed for all time, and it has saved many hundreds of lives.

Acute mastoiditis, like acute appendicitis, is always a grave condition and the more familiar you become with the uncertainties and complications of mastoiditis the more you realize that you must have very definite knowledge of the various kinds of mastoiditis, classified according to their causitive factor, if you wish to separate those who will get well without operation from those who will not. And even under the most favorable conditions, such as obtain in the large hospitals, I have seen several deaths following "watchful wait-

ing". This is true of all kinds of mastoiditis but more especially is it true of the streptococcic or pneumococcic form. In this, hours, not days count; and the one who waits too long will see his patient go to the undertaker as surely as the one who waits too long with his case of appendicitis. And further, any physician who has a clear and definite plan in his mind to handle his appendix cases can use this same plan for his mastoid cases and he won't go far wrong. Osler long ago (1914) said in Prognosis for Appendicitis, there would be no percentage of deaths from appendicitis if every case, commencing with acute pain and developing tenderness and rigidity of the abdomen, and quickening of the pulse, were operated upon within twelve hours. Notice he says hours, not days or weeks. But in the same book I find not a word about acute mastoiditis. Why not? The general practitioner probably sees more cases of mastoiditis than he does cases of appendicitis, but I do not think he realizes it. He has not been taught. He treats them for earache, headache, migraine, Bell's palsy, meningitis, brain abscess, brain tumor, embolism, endocarditis, sleeping sickness, uremia, septicemia, pyemia, etc. This is by no means his fault. The teaching of mastoiditis is now where the teaching of appendicitis was a quarter of a century or more ago. The average general practitioner and patient have great fear of the operation for mastoiditis. And why? Because so many of the cases are left go so long that when the operation is performed the outcome is often fatal and they seem to hear only of the fatal cases and not of the many successful cases. This was so in the early days of appendicitis operation. Dr. Joseph Price told me himself that he was discouraged almost to the point of giving up because the cases came to him so late and so many of them died. But fortunately he lived to see the day when he and his confreres saw the cases come to them early. Then they could report hundreds of cases operated upon without a single mortality. This must have been one of the most gratifying things of these surgeons' lives. They were the pioneers and had a very hard road to travel and to find that they were right and sustained by the people must have been truly wonderful.

You notice Osler has advised operation within twelve hours for appendicitis. Let me illustrate this also in mastoiditis.

Case C. J. B., age 5 years. I saw him myself for the first, no other physician had been called, therefore I could not put the blame on the other fellow. The patient had severe pain on the side of his head, he did complain some with his ear on that side, but there was no discharge, some redness of the drumhead, no swelling behind the ear, and although there was some vague history about having had

pain in that ear for several days this was the first day they thought it necessary to send for a doctor. This is an important factor, because sometimes these cases have gone several days before the people themselves think it necessary to call a physician. After I found that incision of the eardrum produced nothing but blood and some serum, and that there was exquisite tenderness over the mastoid area on pressure, and that the fever was fairly high, I came to the conclusion that it was a streptococcus infection and advised immediate operation. Quite naturally they objected. Of course they would, they were not educated to this. If it had been an appendicitis case they would, most likely, have consented at once. I told them I would wait until the next day and if he was no better he must be operated upon at once. Of course he was no better and all night long he was delirious. This, I think, frightened them more than anything else and they consented to the operation. The operation was performed the day after I saw him for the first time, and yet, as you will see by his history, he had a very stormy time. It was found that he had a streptocosis hemolyticus infection which already had gotten into his blood stream, followed by sinus involvement, endocarditis, anemia, and distant abscess. This is almost a syndrome for streptococcus hemolyticus. This coccus was found in the pus from the operative field, the blood, and the abscess on the hip. He was in the hospital for three months.

Another case: Streptococcus Nonhemolyticus. Anna H., age 2 years. Always well until ten days prior to the first time I saw her. Her physician sent her to me with a history that he had seen the child each day for three days and that there was no pus from the ear, only a watery discharge, but the child complained of so much pain that he thought it best to have a more thorough examination made. Examination showed a reddened, perforated drumhead and slight swelling behind the ear over the mastoid area, which was very tender on palpation. Fever 101°, pulse 84. The child was operated upon the same day and yet the dura was exposed by the diseased process to almost the size of a dime. The bone was soft and boggy, very free bleeding. With a simple curette the whole mass could be scooped out. The dura with the sinus was exposed, there were some granulations over the sinus. The sinus was not opened, it appeared sufficiently healthy to be let alone, at least for the present. I gave the doctor and the family a very gloomy prognosis, but to my astonishment the child got along rather well. So I believe that this was a double infection. The streptococci were there possibly on the last three days or this would have surely been followed by meningitis. There was no anemia or distant abscess.

Are there any objections to early operation on mastoiditis? Yes. The same as the objection of early operation for appendicitis. First, a certain percentage will get well without operation, about 85 per cent in appendicitis; and somewhere between 10 per cent and 80 per cent in mastoiditis, depending on the kind of germ and the resistance of the patient. Second, it is thought to be dangerous to interfere with a commencing infection, before the patient has formed antitoxin or antibodies, and that you are likely to open new avenues of infection. This is quite true, but if the infection is spreading near the meninges and a large sinus it is a different matter and even if you do have a streptococcic infection of the hand or foot and you find a rapid spreading along the lymphatics is it not the custom to open wide, drain, and sterilize the best you can? This was done by both ancient and modern physicians and I question if any treatment has been found to take its place.

Can we diagnose streptococcic or pneumococcic mastoiditis? I think we can. It comes with but little prodromal symptoms, possibly a slight cold, so-called grippe, influenza; of course there may have been scarlet fever or measles, but the attack itself is rather characteristic. First, some pain in the mastoid area, great pain on palpation, little or no pus from the external canal. Incision of eardrum usually only brings forth blood and some serum, little or no relief from incision of the drum head. Fever 99½ to 102 or 103,° pulse 84 to 110. Leucocyte count not very high at first. Sometimes streptococci are found in the blood from the drum head incision.

Prognosis, somewhat similar to appendicitis. There would be but little mortality from mastoiditis if every case commencing with acute pain over the mastoid area, developing tenderness and temperature, and which failed to respond to incision of the drum head, was operated upon in the first twenty-four hours.

When I was a youngster I worked in a drug store in Philadelphia (1891). I well remember the hot debates between the physicians who came behind the prescription counter. The question then was to operate or not to operate for appendicitis. The arguments were pro and con, the same then as the arguments are now for acute mastoiditis, and those of us who live twenty-five years longer will find otologists reporting hundreds of acute mastoidectomies with almost no mortality, the same as surgeons are reporting hundreds of appendectomies with almost no mortality, regardless of the infecting agent, providing that they get the cases early enough.

"Watchful waiting" in cases of streptococcic or pneumococcic mastoiditis (sometimes called haemorrhagic mastoiditis) makes woeful waste of human lives.

Name: C. J. B. Address: Philadelphia, Pa. Age: 5½ years. Admitted: May 8, 1924. Discharged: Aug. 8, 1924.

Diagnosis: Mastoiditis (acute left).

Family History: Father and mother living and well. Only child.

Previous Medical History: Chickenpox. Suffered at times with pain in right hip.

History of Present Condition: Earache for past two weeks. Child is well developed. Nervous system normal. Lungs O. K. Heart sounds: harsh systolic murmur over mitral area, transmitted to mid-axillary line and up to carotids. No sign of decomposition. O. K. for operation.

Operation, May 8, 1924, Left Mastoid: Ether anesthesia. Operation performed by Dr. Stout, assisted by Drs. Hamlin and Mundie. Simple mastoid: the periosteum stripped easily. The bone showed osteomyelitis from one end to the other. There was free pus in the antrum. Neither the sinus nor the middle fossa were exposed. There was a small amount of pus near tip of mastoid.

Laboratory Tests: Wassermann, negative. Blood culture, positive for streptococcus hemolyticus, which was also found in the pus from the field of operation. This streptococcus was also found later from a culture made of the pus from the right hip. The hip condition developed some time after the mastoid operation.

Temperature: May 8, the day of operation, temperature 102½°, to Aug. 8, the day he was discharged from the hospital, his temperature went through all gradations from normal to 105½°. On May 13 and 14 he had a typical steeple temperature of sinus involvement. From the 15th to the 17th he had sustained temperature of between 104 and 105°, which I think was due to pyemia. Later the temperature fluctuated, due to endocarditis and hip abscess, and finally measles.

Leucocytes —	May 8, 1924....11,800	R. B. C. —	May 8, 1924....4,000,000
	May 13, 1924.... 9,900		May 13, 1924....4,000,000
	May 15, 1924....11,400		May 26, 1924....3,500,000
	May 16, 1924....14,300		June 11, 1924....2,970,000
	May 17, 1924....28,300	Hemoglobin —	May 8, 1924....80%
	May 21, 1924.... 7,100		May 13, 1924....60%
	May 26, 1924....14,300		May 26, 1924....60%
	May 30, 1924....14,700		June 11, 1924....60%
	June 11, 1924....15,600	Urine—Negative for sugar and albumen and casts.	

X-ray Diagnosis, May 8, 1924: The right mastoid appears normal; the cells small and indistinct. The left mastoid shows an area near the tip and backward to the sinus, to the cell wall. Process extending throughout the whole area of the mastoid. Diagnosis: Acute Mastoiditis, left. (Signed) Dr. Martin.

Examination by Dr. Grant, May 15, 1924: Child lies quietly in bed; is oriented as to time and place, and answers questions well:

knows all objects. Cranial nerves all negative, except possibly a weakness of right seventh. The right corner of mouth is not drawn as well as the left one. Biceps, triceps, Achilles and patella reflexes are all equally exaggerated. Bilateral ankle-clonus. No Babinski. Bilateral Kernig's sign. Neck slightly stiff. The picture at present suggests to me not a meningitis, or anything else. There is no petechia to suggest sinus involvement.

Dr. Willard, Orthopedic, May 29, 1924: Motion at the right hip is limited in all directions. Muscle spasm is marked. Attempted motion extremely painful. Tenderness over trochanter, upper third of femur and tuberosity of ischium. Also over all the femoral head anterior. Lymphatics in groin enlarged. Motion of left hip is also restricted, but not as much as the right. Muscle spasm develops on the extremes of motion being reached. The X-ray diagnosis is not concurred in. It is believed that the change noted in the right femur is due to inflammation rather than position. Diagnosis: Infectious arthritis, both hips. More advanced on the right side. Treatment by Buck's method to both lower extremities. Treatment suggested: Mercurochrome, 220, intravenously.

Dr. Willard, June 2, 1924: Believe there is pus in the right hip-joint which should be drained. Recommend treatment as marked above.

Dr. Stout, June 2, 1924: Have read your report. Suggest you will proceed as you have suggested.

Second Operation by Dr. Dorsavage, June 3, 1924: Incision of right hip down to, but not into, joint. Several ounces of pus were evacuated. Drainage tube in place.

Professor E. B. Gleason and Dr. Douglas Macfarland were in charge of this case for several weeks and much of the credit for the successful outcome of the above case is due to their efforts.

Name: R. W. *Addresss* Philadelphia, Pa. Age: 16 years. Occupation: Student. Admitted: Aug. 14, 1924. Discharged: Aug. 17, 1924; why discharged, improved. Readmitted: Aug. 20, 1924. Died: Aug. 24, 1924.

Family History: Father living and well. Mother died of tuberculosis two years ago. Two other children living and well. One sister had a mastoid three years ago.

Previous History: Measles, scarlet fever several years ago. Has had colds more than the average. Tonsils and adenoids removed several years ago.

History of Present Condition: One afternoon, July 10, 1924, he was seized with a severe pain in the right ear and that night some blood exuded from the ear. This partly relieved the pain. Since

that time there has been a discharge from the right ear, tinged with blood. The day of the onset some glycerin was put in the ear. The next day the ear was irrigated with warm water. The condition failed to improve and on July 13, 1924, he was taken to Dr. S., where he was treated until he was admitted to the hospital. He improved very much while in the hospital and in a few days, Aug. 17, 1924, he was allowed to go home.

Laboratory Tests: Pneumococcic spinal fluid. Urine, negative. Leucocyte 13450.

Operation: He was readmitted Aug. 20, 1924, having taken a turn for the worse. He had a severe chill. The operation was done the same day, Dr. S., assisted by Dr. Stout. An unusual condition was found. The Sigmoid sinus was directly against the external canal and it was found impossible to get into the antrum in the usual way. The antrum was opened by going in from the external canal. The sinus was uncovered and appeared healthy. Some diseased bone was removed around the tip of the mastoid and all necrotic bone removed. The sinus was not opened. Iodoform gauze packing. Two stitches.

We soon began to have evidence of sinus involvement. Typical steeple temperature. Lung embolis fifth day after operation, just as we were ready to do a second operation.

Name: A. H. Address: Philadelphia, Pa. Age: 2 years. Admitted: June 2, 1922, Anderson Hospital, 1711 Green street, Philadelphia. Discharged: June 8, 1922; why discharged, improved.

Diagnosis: Acute mastoiditis (right). Chief complaint: Pain in right ear.

Previous History: Negative.

Family History: Negative.

History of Present Condition: Always well until ten days ago, when some water (?) came out of her right ear. This stopped several days ago and she began to have fever, pain, and sleeplessness.

Laboratory Findings: Streptococci (not classified).

Examination of Patient: Negative except painful and tender right mastoid. No discharge in external canal.

Operation: Jan. 2, 1922, Dr. Stout. Simple mastoidectomy. Usual incision. The bone was soft and boggy, the bleeding was very free. With a simple curette was able to scoop out the soft bone, the dura was already exposed by disease to the size of a ten cent piece, some granular tissue over the sinus. All of the bone was removed the sinus was not opened. Iodoform packing.

The child made an uneventful recovery.

Walnut and Sixteenth Streets.

VACUUM MASTOIDITIS.*

Dr. George F. Keiper, Lafayette, Ind.

Permit me to call your attention to a condition which I reported to the Section of Oto-Laryngology of the American Medical Association in session at San Francisco, in 1923. I have chosen to call it "Vacuum Mastoiditis". Pus is not to be found in the mastoid cells and no pus issues from the middle ear.

Several years before the advent of X-ray diagnosis I was consulted by a lady, Mrs. F., age 28 years, from a neighboring town, suffering from all the classical symptoms of acute mastoiditis. Her pain was terrific and the usual remedies for its control were futile. The mastoid was very tender to touch and pressure. The usual precautions were taken to differentiate psychic from organic pain. Her pain was organic in origin. But on opening the mastoid cells no pus was found, much to our chagrin. Her physician and I thought that an unnecessary operation had been performed. But she was immediately freed from all pain and went on to an uneventful recovery. The lining membrane of the mastoid cells was barely hyperemic and the bone chips revealed nothing unusual.

For quite awhile my conscience troubled me until Dr. Greenfield Sluder, of St. Louis, called our attention to the condition which he called vacuum headache due to occlusion of the fronto-nasal duct, with consequent absorption of the air contained in the frontal sinus. This form of headache yields to nothing except reopening of the duct admitting air to the sinus, restoring the balance there with the outside air, for be it remembered the air presses upon every part of us at the rate of fifteen pounds to the square inch. Then a great light dawned and I realized that I probably observed a similar condition in her mastoid cells; her aditus ad antrum had become occluded, preventing aeration of the cells. The blood will grab off oxygen from the air anywhere in the body if it has a good chance.

I awaited another like case and was rewarded in being called by her family physician, Dr. Harry Laws, to see Mrs. Rose G., Dec. 8, 1920, who was suffering with the tortures of the damned with pain in the left mastoid process. The X-ray plates revealed no pathology. Her temperature was normal. Her pulse was 90 and the

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respiration 36. She was a victim of migraine. Two years before she underwent a successful operation for acute appendicitis. All laboratory examinations were negative. Her pain was organic in origin. I recommended opening of the mastoid process and confidently predicted that no pus would be found but that it was absolutely necessary to admit air to the cells to replace that lost to the circulation of the blood as it coursed through the delicate mucous membranes lining the cells. No pus was found, the mucous membrane was barely hyperemic and the bone chips revealed nothing. The wound was sewed up tight after thorough exenteration of the cells. I may state in passing that the aditus ad antrum is better left untouched. All pain ceased immediately and she went on to an uneventful recovery.

The last case of this trouble which I wish to report I saw but six months ago. Charles C., age 35 years, locomotive inspector, Nickel Plate road, came Feb. 25 suffering with a left mastoiditis, but with no discharge from the middle ear. X-ray plates were negative, as well as the laboratory findings. All remedies used to alleviate the pain were futile. The mastoid was exquisitely tender to touch and pressure. The usual pain tests showed it to be organic. His history revealed that four months before while inspecting a locomotive, on alighting he slipped and fell, striking the left mastoid process. It has been tender ever since, but the pain was slight and bearable. But for the week preceding his visit to me he began to suffer tortures with the pain in that mastoid process. His physician, Dr. A. C. Arnett, obtained no relief from the usual remedies used for the control of pain and he referred him to me. His temperature never rose above normal and likewise his pulse. Examination, among other things, revealed a retracted ear drum with stenosis of the Eustachian tube. X-ray plates were negative. Laboratory examinations were negative. His pain was organic to the usual tests.

Here was an interesting situation as to compensation under our laws. Was the condition due to the accident or to some intercurrent trouble? Was the railroad liable or the patient himself for treatment? Of course I recommended opening the mastoid cells, with the prediction that no pus would be found. If the aditus was occluded with bony formation, which takes time to form, then the liability was to be with the railroad, but if with an inflammatory thickening then the liability was to be with the patient.

I asked the local surgeon, Dr. A. C. Arnett, to assist me in the operation. As we uncapped the mastoid cells he remarked that he could see the air bubbling into them through the overlying blood.

After thorough exenteration of the mastoid structure we explored the aditus ad antrum and found the occlusion to be a bony one. We could not enter the middle ear and we did not persist in our efforts. The liability was then clearly with the railway company. The wound was sewed up tight and he went on to recovery promptly, relieved of the severe pain which he previously suffered.

At the last meeting of the American Medical Association, Dr. Samuel J. Kopetsky, of New York, in the Section of Oto-Laryngology called out attention to similar conditions showing slides of bone removed from advanced cases with hemorrhagic infarcts therein, *i. e.*, in the advanced stage of the trouble. Dr. John F. Barnhill, of Indianapolis, in discussing the paper, among other things, said "physicians who witness mastoid surgery in the class, often express the belief that, since no pus was present, the operation seemed wholly unnecessary. Such, however, is not the case, since early operation often gives most brilliant and gratifying results."

As intimated above, care must be exercised to distinguish between psychic and organic pain. Psychic pain is *1*, cortical in origin; *2*, neurotics will not allow the examiner to touch the alleged tender mastoid, complaining that combing the hair is very painful. If the examiner will distract the attention of the patient and then touch the mastoid no pain is produced; *3*, the pulse rate and blood pressure are not raised when thus touched; *4*, the pain reflex in the tissues surrounding the eyes is not present; *5*, the patient does not shrink away when the tender spot is touched; *6*, there is no dilatation of the pupil; *7*, sleep is not interrupted.

On the other hand organic pain is *1*, optic thalamic in origin; *2*, the patient is willing that the examiner touch and explore the tender spot; *3*, the pulse rate and blood pressure are raised; *4*, the facial expression is characteristic: the palpebral fissure is narrowed and the eyebrows are knitted and the forehead furrowed with wrinkles, for the pain is optic thalamic; *5*, the pain reflex is present; the patient shrinks on touch; *6*, there is dilatation of the pupils; *7*, sleep is interrupted.

An analogous condition is present on the other side of the aditus in the middle ear. Vacuum earache is common in children. The child thus affected awakes crying with earache. The muscular movements involved open the Eustachian tubes and the middle ear is areated and the child drops off promptly into quiet sleep.

14 N. 6th Street.

OSTEOMA OF THE FRONTAL SINUS WITH A REPORT OF THE CASE.

DR. F. H. LEE, Richmond, Va.

These rare, slow-growing tumors, at one time called "petrified brains", and to the old physicians a source of much mystery, are of historic interest. They not infrequently produced hideous deformity and death, and because of the unfavorable results of operative interference provoked a dismal prognosis. The supposed futility of radical surgery is evidenced by Berlin's advice to remove only the eye in cases of frontal sinus osteoma with rupture into the orbit. Sir John Bland-Sutton cites an interesting case in which a swelling the size of a pea was noticed at birth. At the age of 9 it had destroyed the eye. At the age of 25 the skin of the brow sloughed; and eight years later the tumor fell out of the orbit. In 1881 Herman Knapp reported 11 cases of osteoma of the frontal sinus, of which, his own was the first recorded in this country. In 1907, Gerber reported 87 true cases of frontal sinus osteoma, and E. C. Sewall in 1918 added cases from the literature with the report of his own, bringing the number to 93. Since Sewall's report I have counted 6 cases in the literature, as follows: Reeve, 1; Barnhill, 1; Boardman, 2; Thomas, 1; and Reh, 1. This brings the number of cases, including the one here reported, to 100. It is interesting to note here, that Culbert, in 1918, gave a rough total of 215 as representing the number of all cases of osteoma of the nasal accessory sinuses in the medical literature since 1748, and that the frontal sinus holds a large share of this number, nearly one-half. Kikuzi, analyzing 54 cases, found 26 frontal, 11 ethmoidal, 11 antral, 5 sphenoidal, and 2 nasal. On the other hand, Gerber gives the percentage of those arising in the ethmoid as 12 to 8 to those arising in the frontal sinus. An idea of the infrequency of occurrence may be gotten from Andrew's report of 8 cases of bony growths of the orbit out of nearly 430,000 cases of eye diseases. As to age, about 50 per cent occur during adolescence, and 80 per cent occur under the age of 50.

Histopathic Origin: Various theories have been advanced as to the origin of osteoma. The question does not seem to be definitely settled. According to Ewing, histologic study fails as a rule to distinguish between simple hyperplastic growths and true osteomas; and

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that the gross and clinical features seem to offer the best criteria by which to separate them; also that limitation of growth is characteristic of the inflammatory type, but that true osteomas progress steadily until extirpated. Though the growth of an osteoma may be over a period of ten years or more before causing annoying symptoms, there may be comparatively rapid growth, as in the case reported by Thomas, in which one year after extirpation the tumor had grown to twice the size it was before operation. Osteoma may be composed of either the compact or cancellous type of bone. The former is the usual type seen in the frontal sinus and in consistance may be like ivory.

Fig. 1. Drawing of the patient before operation; showing the tumor in the inner canthus of the right eye and the marked ocular displacement.

Etiology: Though the writers are not entirely in accord as to the etiology most of them can find expression of their views in Culbert's summary, which in substance is, in osteomas of the nasal accessory sinuses there is in all probability a congenital defect which may or may not be stimulated to activity; the activating influences being: the unusual activity in the frontal region during adolescence; endogenous irritations and external traumatism.

Symptoms: Primarily the symptoms must be classed as those due to pressure. Of the early symptoms, if there are any, headache is the most frequent. Later the symptoms will depend on the cavity encroached upon. Displacement of the globe, symptoms depending

upon complicating infections, embarrassment of nasal respiration, and symptoms of intra-cranial pressure may be mentioned as likely to occur.

Diagnosis: Radiographic findings make the diagnosis self-evident. Where the tumor can be felt there is little difficulty experienced, and where there is beginning displacement of the globe or distension of the sinus, without well founded cause, it should be suspected.

Prognosis: Gerber gave apt expression to the condition in saying that these tumors had the peculiarity of benignancy of histologic

Fig. 2. Photograph taken eight weeks after operation; showing that the eye has returned to practically its normal position. In this picture the deformity of the brow is exaggerated and there is an apparent ectropion of the lower lid which does not exist.

structure but malignancy of effect upon surrounding structures. The following mortality statistics of Birch-Hirschfeld serve to give a good idea of what the surgeons formerly faced in encountering these cases. Unoperated: frontal, 48.2; ethmoid, 80.0; sphenoid, 100.00; operated: frontal, 13.6; ethmoid, 12.7; sphenoid, 33.0. Death was usually caused by meningitis or cerebral abscess, and even today these complications cause us most concern, so that a sinusitis complicating

an osteoma would make the prognosis less favorable. Since the introduction of asepsis and the improvement of surgical technic, especially since Killian's work, the prognosis following operation is certainly favorable in the early cases, and much more so than formerly in the advanced ones. The difficulties of removal depend upon the size of the growth and the extent of its attachment.

Treatment: The treatment is early extirpation of the tumor. The technic is somewhat after the modified radical Killian operation with extension of the inner end of the skin incision upward if necessary.

Fig. 3. Radiograph of the sinuses before operation, front view; showing the tumor nearly filling the large right frontal sinus and protruding into the orbit. A distinct tumor can be seen in the upper inner angle of the left frontal sinus.

The compact tumors when connected by a pedicle, or the attachment is not too extensive, may be removed by gradually prying and rocking the tumor free with suitable instruments. Care should be used to avoid opening the dura; and when the operation is at all extensive external drainage should be established.

References will be given to the literature reviewed, on which, this introduction is based. Sewall's and Culbert's reports are excellent and carry full bibliographies.

Report of the Case: J. H., male, age 17 years, colored, errand boy, was first seen May 22, in Dr. Karl Blackwell's clinic at the Medical College of Virginia. He complained of a swelling at the upper part

of the inner angle of the right orbit. The patient said he had no other symptoms, and that he knew the swelling was there only when he looked in the mirror. It was first noticed one year ago. The growth increased in size and then he thought it decreased some. On Apr. 1, 1924, he bumped his forehead against the end of a wagon, cutting the skin of the brow 1¼ inches, temporally. The wound was treated surgically and healed without trouble; but since then the tumor has grown rapidly. When questioned about diplopia and epiphora he said he had the former occasionally and the latter when

Fig. 4. Radiograph of the sinuses before operation, lateral view; showing invasion of the cranial cavity.

reading. I noticed he closed one eye when reading. The family history and his past history were negative.

Inspection revealed a slightly tender tumor, about the size of a small cherry, apparently pushing through the upper, inner and under margin of the orbit. To touch it felt as if it were a smooth, round, bony growth bearing slight resilience. There was edema of the surrounding tissue and the lid drooped. The globe was pushed forward, outward and well downward. The head was tilted on the horizontal and vertical axes to the right. Examination of the globe was negative, excepting a slightly dilated pupil. The vision in the right eye was 20/30, in the left eye 20/20. In the light the pupil of the right

eye measured 3 m.m., in the left eye 2 m.m. The pupils reacted directly and consensually; but a little slowly in the right eye. The accommodation was 8.5 diopters in the right eye. The interpupillary distance was 70 m.m.; pupil O. S. was 32 m.m. from the midline; pupil O. D. was 38 m.m. from the midline, and 8 m.m. below the horizontal plane. The ocular movements were good in all fields, probably O. D. lagging in the upper cardinal directions. Screen test, O. D. turned up and in; O. S. turned down and in. Binocular uncovering, O. D. squinted down and out; O. S. squinted up and out.

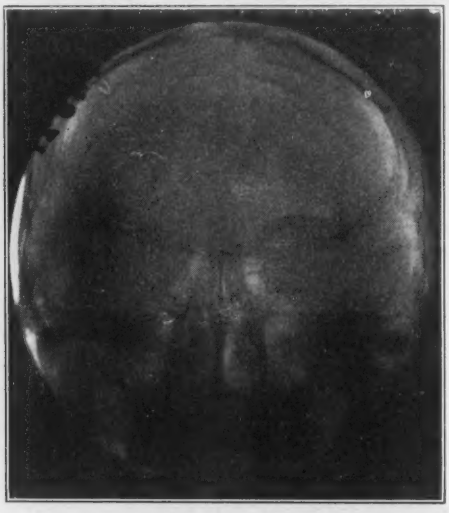

Fig. 5. Radiograph of the sinuses after operation, front view; showing small part of the tumor left in the upper median part of the right frontal sinus and the separate growth in the left frontal sinus. The anterior edge of the remaining shell can be seen, faintly, immediately to the right of the septum of the frontal sinuses.

A plot of the diplopia mapped on the tangent curtain gave in all fields a rather marked vertical separation of the images with slight horizontal separation. There were slight changes in the various fields.

The field of vision was practically normal. The upper nasal quadrant was encroached upon, but this was due to the swelling protruding into it.

The right side of the nose was free from obstruction and secretion, and presented a healthy mucus membrane. The throat examination was negative. The sinuses did not transilluminate. All other examinations were negative; including the blood (Wassermann), urine,

physical, and neurological. The radiographs confirmed the clinical diagnosis of osteoma of the right frontal sinus.

On June 22 the patient was operated on at the Memorial Hospital. The brow was shaved and strict asepsis observed. The mass in the orbit was easily extirpated and found to be thinly encapsulated. The sinus was opened and the tumor was immediately encountered. The mucus membrane was very thick. With a ronguer the tumor was exposed anteriorly and was removed with the ronguer and curette. The cranial cavity was entered at the upper medial part of the sinus,

Fig. 6. Radiograph of the sinuses after operation, lateral view; showing the remaining shell. The partly flexed hand will serve to explain the prominent shadow in this view.

the dura being exposed about 10 m.m. sq. At this point the tumor had eroded the sinus wall. It was in contact with the dura, and was thinly encapsulated. The floor of the sinus was removed, making an opening 10 m.m. sq. into the orbit. The bony brow was so encroached upon that it was removed for a distance of 2 c.m., precluding the possibility of retaining a cosmetic bridge. The tumor was curetted away to points beyond which I did not think would be reasonably safe; that is, the posterior wall in the median line, including the frontal crest, and the portion of the frontal just external to the

cribriform plate. With this there was left the small but distinct tumor in the left frontal sinus. While removing the main mass, encapsulated lateral nodules were pried from their beds in the sinus wall leaving behind smooth pockets. The wound was closed with external drainage established. The growth was evidently of the cancellous type of bone.

The patient had an uneventful recovery from the operation. The wound healed well and all stitches were removed on the eighth day.

Dr. W. H. Cook, the pathologist, submitted the following report: "Tumor-like growth of fibroblasts which are producing large amount of collagen fibrils and frequently are being transformed into osteo-

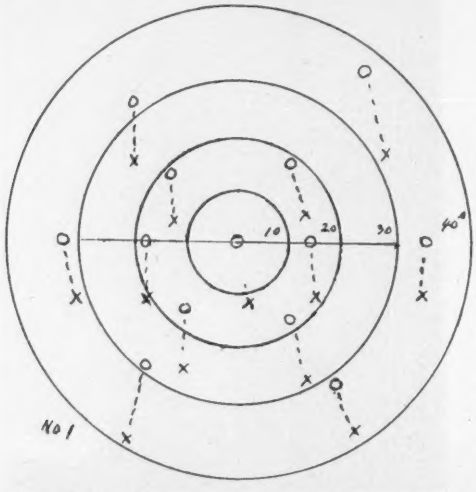

Fig. 7. Plot of fields of diplopia, before operation, at 75 c.m.; red glass over left eye; the right eye fixed; showing considerable separation of the images.

blasts with formation of bony trabeculae. Mitotic figures are not observed. Pathological diagnosis: osteoma (inflammatory exostosis).

Dr. J. L. Tabb, the roentgenologist, took pictures on the ninth and reported the following: "Majority of tumor removed. Small portion of tumor remains behind the upper portion of the right frontal sinus compartment, and apparently behind the upper portion of the left sinus close to the midline." If the right hand, semiflexed, is held up it will give a good idea of the remaining shell, and how it cast the prominent shadow in the lateral view. The shadow cast from the left sinus is from a distinct tumor.

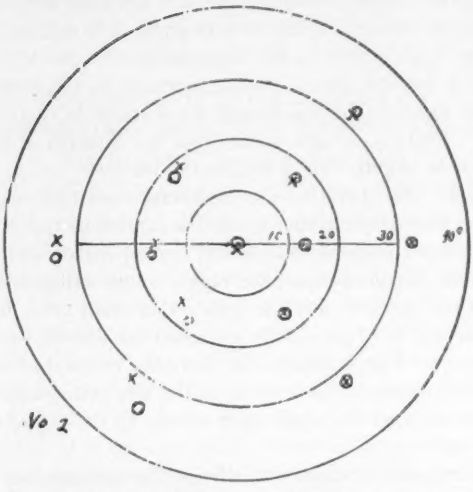

Fig. 8. Plot of fields of diplopia, twelve days after operation, at 75 c.m.; red glass over left eye; right eye fixed in fields on the right; showing the decrease in the separation of the images with fusion in two fields on the right.

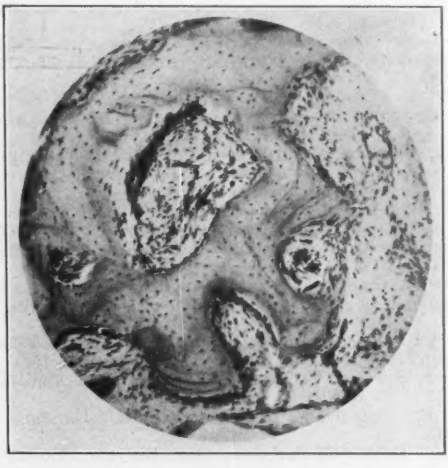

Fig. 9. Photo-micrograph of section of the osteoma; showing average microscopic appearance under the high dry lens.

Aug. 2, 1924. There is some proptosis of the right eye. The visual acuity is 20/30 corrected to 20/20 with a plus 0.75 cyl. ax. 75. There is binocular single vision in the right fields. In the left fields the patient has a vertical diplopia which increases in the field of action of the right superior oblique, though there seems to be no limitation of motion. There is no annoyance from the diplopia as the patient overcomes it by slightly tilting his head to the left.

Conclusion: The operation was undertaken with the hopes of extirpating the tumor, but in that it was the cancellous type of osteoma with an extensive posterior attachment and in that it abutted or attacked a most dangerous area, the region of the cribriform plate, it was considered safer to leave a shell rather than enter the cranial cavity in this region. Later, if the symptoms justified it, or there was further invasion of the cranial cavity, complete removal of the growth would be undertaken. The growth in the left sinus, which seemed to be formed around the upper part of one of the septa, was to be dealt with later.

From the negative findings of a thorough examination of the patient, and from the physical features of the tumor, especially its being encapsulated, I regard the growth as a true osteoma with an inflammatory phase superimposed upon it by traumatism which played no part etiologically but acted only to accelerate its growth.

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114 North Fifth Street.

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HERPES ZOSTER OTICUS RELIEVED BY SPHENO-PALATINE GANGLION TREATMENT.*

DR. SIMON L. RUSKIN, New York.

Herpes zoster oticus is a rare condition especially when involving the tympanic membrane. I was forunate enough to observe the herpetic eruption in the case reported and to afford almost immediate relief by the application of 10 per cent cocain to the nasal ganglion.

Case: M. K., housewife, age 34 years, began complaining nine years ago of repeated attacks of otalgia associated with badly diseased tonsils. She had her tonsils removed five years ago and since then developed persistent itching in the ears and a typical nasal ganglion neuralgia. She had a sensation of dryness in the nose and throat, pain deep in the eyes, at the root of the nose, headache, mastoidalgia, and pain extending into the muscles of the neck and shoulder. During the last year she began having pains in both maxillary regions and on the advice of her dentist had all of her teeth extracted. The maxillary pains, however, continued just the same. She then developed a choking sensation in the throat as though a foreign body were present.

Nasal examination revealed a mild atrophic rhinitis and posterior ethmoiditis.

Considering the nasal ganglion symptoms I cocainized both ganglions and in a few minutes the entire neuralgic picture cleared up and the itching stopped completely. Under this nasal ganglion treatment she had improved rapidly, the choking sensation in the throat and the head and neck pains disappearing almost completely.

On Nov. 29, five weeks from the day she first applied for treatment, at about 2 o'clock in the afternoon she took sick with headache, weakness and lancinating pain in the right ear, radiating outwards to the auricle. In addition the entire nasal ganglion neuralgia recurred with unusual severity. Examination of the right ear that evening showed the drum membrane diffusely reddened, slightly swollen, the short process of the malleus, however, still visible. The medial third of the external auditory meatus was also swollen and reddened. While examining the ear with the Zeiss enlarging lens I suddenly observed the formation of three distinct vesicles on the

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*Reported from the Research Club of New York Post-Graduate Hospital, Department of Otology.

posterior half of the drum membrane and two on the anterior wall of the external auditory canal near the isthmus. The contents of the vesicles, at first clear, soon became turbid. During this time the patient complained of intense pain in the right ear. The left ear remained unaffected. The application of 10 per cent cocain to the right nasal ganglion relieved the pain completely in a few minutes.

The next day, the drum showed the vesicles greenish, surrounded by a zone of redness, the drum and canal still remaining swollen in the vicinity of the pustules. On the third day, the pustules appeared dried on the drum and canal with a zone of redness surrounding them, somewhat less distinct. The drum had regained some of its lustre anteriorly. It was at this stage that the case was demonstrated at the New York Clinical Society. On the fourth day the patient began complaining of noises in the ear and impairment of hearing. Functional testing at the onset of the attack showed a normal ear, on the fourth day, however, Weber's test localized to the right, Rinne was positive, Schwabach diminished. The watch was heard 10 c.ms. on the right and 1 m. on the left. The patient complained of slight dizziness, but not the typical labyrinthian dizziness. The drum membrane and canal showed circumscribed superficial ulcerations at the site of the pustules.

Her previous history showed that she had typhoid fever fourteen years ago, pneumonia eight years ago, influenza the year later, and following this rheumatism of the wrists and finger joints. Two years ago she had an attack of pain in the right shoulder, followed by an eruption of vesicles which became purulent and then cleared up. She got a similar attack on the left shoulder several weeks later. This attack from its history is suggestive of herpes zoster.

The differential diagnosis in this case is between myringitis bullosa, eczema and herpes. The vesical formation and involvement of the canal was not characteristic of myringitis. The short duration and neuralgic picture is also not that of eczema. The involvement of the medial portion of the canal exclusively would tend to rule out a furunculosis which generally affects the outer portion of the meatus. It was also important in the early stage of the case to exclude acute otitis and thus avoid an unnecessary paracentesis and a resultant acute otitis. This I did chiefly on the functional test showing a practically unimpaired middle ear, the retention of some of the drum details and the appearance of the vesicles.

It was very interesting to note that the pains of the herpes zoster oticus could be relieved by cocainization of the sphenopalatine (nasal) ganglion.

351 West 86th St.

DACRYOSTENOSIS FOLLOWING OZENA OPERATION AND ITS CURE.

DR. J. MALINIAK, Cincinnati.

Numerous surgical methods have lately been described for the radical cure of atrophic rhinitis with ozena. Some of them have an experience of many years of observation, as the methods of Halle and Lautenschläger.

On twenty operations which were performed by me in ozena, seven cases are still under my observation with eighteen months to two years since the operation. A detailed report on this work will follow soon.

Here, I want only to discuss an annoying complication for the surgeon and patient which may follow this operation, namely, the injury of the nasal lachrymal duct. No surgical technic designed to relieve a disease can be acceptable if possibly followed by another trouble not less pronounced than the first. This complication is not equally incident to the different methods used at the present time. Methods which consist in narrowing of the nasal fossae by infraction and mobilization of the lateral nasal walls, are particularly susceptible to this injury. As these methods are also far from the best for the cure of ozena, one has to be especially careful in their adoption.

The following history of a patient, operated for an atrophic rhinitis with ozena by two different methods, is particularly interesting from this point of view.

Miss B. H., age 21 years, had been treated for many years for atrophic rhinitis with ozena. At the age of eight, the patient was already regularly attended by a physician for her nasal troubles, which consisted in crust formation and bad odor. The Wassermann test was negative. Treatment by profuse nasal lavage and the application of the entire medical arsenal generally in use in ozena continued until 1922.

In January, 1922, a double ethmoid operation had been performed without any improvement.

In November, 1922, an ozena operation, by Halle's method, was performed on the left side, and the following day after the operation the eye on the same side started to lachrymate.

In March, 1923 (five months after the last operation), I saw the patient for the first time. The left nasal fossa (operated by Halle's

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method)[3] was quite narrow with a hyperemic inferior turbinate close to the septum. Accumulation of crusts in the posterior part of the nose behind the narrowed space, especially in the spheno-ethmoidal region, persisted. Epiphora without dacryocstitis was present.

The right side was wide with atrophic turbinates covered by a gray, dirty mucous membrane with large crusts in the nasal cavity, and a marked odor.

In April, 1923, I performed a modified Lautenschläger operation[5] on the right side with bone transplantation. Six weeks later I closed the epidermized antrum cavity. The result was very satisfactory, as crusts and odor disappeared and the nasal cavity remained narrow and covered by a healthy looking mucous membrane (eighteen months after the operation).

In July, 1923, as crusts continued to form on the left side (previously operated by Halle's method) in the middle meatus and in the spheno-ethmoidal region, I performed a curettage of the antrum, ethmoid and sphenoid. A wide communication of the antrum with the nasal cavity was established in the middle meatus and the ethmoidal wall was pushed toward the septum. No transplantation of bone in the lower part of the nose was necessary, as the narrowing of this region by the previous Halle operation was satisfactory. The antrum contained an evidently diseased mucous membrane, and similar conditions were found in the sphenoid. The ethmoid was sclerotic. The local conditions were greatly improved after this operation.

Eye Complication. However, the patient continued to be treated by an ophthalmologist for her chronic dacryocystitis on the left side, which seemed to progress.

In January, 1924, the ocular conditions became worse and a phlegmon of the sac appeared, requiring repeated incisions. A radical intervention was postponed until the phenomena of peridacryocystitis should subside. In spite of the most skilful care received by the patient from the oculist, in September fistulization of the tear sac occurred. Because of the abnormal nasal condition (ozena of long duration and numerous nasal operations), the endonasal tear sac operation seemed not to be indicated. On the other hand, an external operation was not possible in view of the extensive chronic inflammation of the region, with suspected pathology of the underlying bone. At the request of the oculist, the endonasal opening of the sac was decided upon and I performed this operation Sept. 19, 1924. All symptoms, such as epiphora, swelling and fistulization, disappeared entirely during the first days after the operation, and the patient could

be finally considered as cured of her atrophic rhinitis as well as of dacryocystitis.

Anatomical Considerations. The intimate anatomotopographical relations of the lachrymal apparatus with the nasal fossae make us understand the danger of the injury of the lachrymal duct during some ozena operations. It explains also why the endonasal opening of the lachrymal sac is the most logical procedure in case of dacryostenosis.

The lachrymal sac and duct can be considered as a unique-canal whose upper blind part (the sac) is located in the lachrymal fossa and the lower part (duct) in a bony canal, which opens in the anterior part of the inferior meatus.

The sac is continued into the nasal lachrymal duct without any demarcation. It is about 12 m.m. in length with a diameter of 5 m.m.

The lachrymal duct is situated in the inner antral wall, throughout the extent of the middle meatus. It has a length of about 15 m.m., with a diameter of about 4 m.m. The duct penetrates the nasal mucous membrane of the inferior meatus obliquely for a short distance, forming a valvular fold.

The lachrymal fossa, where the sac is located, is formed anteriorly by the resistent frontal process of the maxilla, the posterior portion being formed by the thin lachrymal bone.

One or the other of these bones can predominate in the formation of the lachrymal fossa, which explains the more or less pronounced resistance offered to the chisel in the removal of these bones during the endonasal tear sac operation.

By looking into the nasal fossae, one notices on the lateral wall, under the insertion of the middle turbinate and in front of the unciform process, a protuberance named by Kopsch, as Torus Lachrymalis. This space corresponds to the location of the sac and is a very important landmark for the endonasal opening of the sac. The windows in the mucous membrane and bone should be made in this place. Ordinarily bulging in the nasal cavity, the torus lachrymalis can also be flat or even concave, in which case the window formation will be more laborious.

Surgical Methods Used for Ozena Cure. Let us see to what degree these anatomical points are taken into consideration in the different surgical methods proposed for the cure of ozena. Three groups of operations are actually used for this end.

1. Narrowing of the nasal fossae by submucous transplantation of fat, bone, mucous membrane of cartilage into the septum, nasal

floor or lateral wall of the inferior meatus: (methods of Brünings,[1] Freudenthal,[2] Pollock,[7] etc.). Narrowing by submucous paraffin injections (Moore).[6] The sinuses in these methods are not treated.

2. Narrowing of the nasal fossae by submucous transplantation in the nasal floor and lateral wall of the inferior meatus of bone or cartilage. This part of the operation is preceeded by a radical cleaning of the antrum, ethmoid and also sphenoid cavity, if the latter is diseased. (New Lautenschläger method.)[5]

3. Narrowing of the nasal fossae by mobilization of the lateral walls preceded by endonasal (Halle's method)[3] or transbuccal curettage of the antrum and ethmoid. (Methods of Seiffert,[9] Hinsberg,[4] Ramadier,[8] etc.)

The injury of the nasal lachrymal duct in the first two groups of operations has to be rather exceptional, as no mobilization of the lateral walls takes place. The infection of the duct is, nevertheless, possible as a result of injury of the mucous membrane in the inferior meatus near the ostium, or by continuity of the infection from the transplant.

The narrowing is accomplished in the new Lautenschlager operation by submucous transplantation of bone or cartilage in the floor of the inferior meatus, and in the upper part in the region of the middle meatus, it is done by inward mobilization of the upper and posterior part of the lateral wall. The injury of the duct is scarcely possible during these manipulations, as the bony canal of the duct lies more anteriorly in the maxillary bone, as mentioned above.

The injury of the duct is, however, possible during the curettage of the antrum. This may happen by forcible application of the curette in the prelachrymal recess. This risk is, thereby, the same as in any radical antrum operation. Koffler, Lieblon and Hajek have published cases with injury of the nasal lachrymal canal following antrum operation. Some rhinologists to avoid this complication, remove in this surgical intervention, only the lower part of the bony lateral wall of the inferior meatus.

Halle's operation for ozena consists in displacing the anterior wall of the nose inwards by endonasal manipulations: The mucous membrane incision extends from the anterior end of the middle to the anterior end of the inferior turbinate and across the floor to the septum. The bone is chiseled along the vertical incision and then backwards at its upper and lower end. With a strong elevator, the loosened wall is pushed inwards towards the septum, and adhesions between the septum and the inferior turbinate are established.

The chiseling of the thin wall is nearly always accompanied by bony fissures. Very often the mobilized wall is divided in numerous fragments dependent upon the strength and direction of the chiseling, as also upon the density of the bone. As the ostium of the nasal lachrymal duct is located at a distance of only a few millimeters from the line of chiseling, we may well be astonished not to find more often an injury of the lachrymal duct.

Seiffert, Hinsberg, Ramadier and others mobilize the lateral nasal walls after the antrum has been opened through the canine fossa. While Hinsberg mobilizes the walls by cuts made in the inner antral wall, below through the pyriform fossa, and above through the nasal process of the maxilla, the others leave the process pyriformis in place and chisel in the wall right behind it. The mobilized walls are fixed in place with silk or wire, anchoring them to the septum.

In practicing Seiffert's method, I have always seen the mobilized walls fragmented. The latter healed nicely, being covered by the periosteum on their inside, but the extreme fragmentation of the nasal wall will always militate against the safety of the lachrymal duct, and in reality we have met this complication.

In my twenty ozena operations performed during the last two and one-half years, I have not met with this accident, since I did not mobilize the nasal walls.

In case of injury of the lachrymal duct, the method of choice for re-establishing the permeability of the lachrymal apparatus will be the endonasal opening of the sac.

The only contraindication for this operation is the stenosis of both canaliculae.

After Kuhnt, 93.7 per cent of diseases of the lachrymal apparatus are of rhinological origin. Adopting the endonasal tear sac operation we perform the causal treatment, which is the most logical.

The method of Toti presents an advantage to ophthalmologists as it is performed by the external route.

According to Toti,[10] his operation is successful in 50 per cent of cases. The closure by granulations and the removal of the muscular apparatus of the sac seems to be the cause of the failures.

The Polyak-West operation, which is now universally adopted, consists in the endonasal opening of the lachrymal sac and establishment of physiological conditions in the lachrymal apparatus, as the strictures are nearly always located below the sac. According to West, this operation is successful in 90 per cent of cases. Its technic is generally known and we want to discuss here only some of its important points.

1. In the flap formation, the lower incision has to be made under the apertura pyriforms which being uncovered gives a much wider view of the operative region.

2. The window formation in the mucous membrane flap has to be made at the end of the operation according to the size and shape of the bony window.

3. The latter must be high enough to allow a probe to be introduced through the lower canalicule to be seen free in the nasal cavity in a horizontal position.

4. The sac has to be opened widely to avoid the possibility of a secondary closure. One centimeter in length and 5 m.m. in width of the sac has to be removed.

5. The flap formation will be fixed by two catgut stitches at the lower edge to avoid its shifting during the after treatment.

6. The packing, which maintains the mucous membrane flap, will remain in place for seven days. The day after the operation the sac is washed through the lower canalicule with a 2 per cent boric acid solution and the same is done the following days for one week.

CONCLUSIONS.

1. Some of the new surgical methods practiced for the cure of ozena endanger the integrity of the lachrymal duct.

2. This is due to the close topographical relations of the lachrymal apparatus with the nasal fossae.

3. Methods in which the lateral nasal walls are infractured and mobilized are particularly dangerous.

4. Methods in which the narrowing of the nasal fossae is performed by submucous transplantation of bone or cartilage are entirely safe in this respect.

5. The endonasal tear sac operation gives the best results in cases of dacryostenosis. It is not contraindicated in infected nasal fossae.

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47 Groton Building.

URTICARIA OF THE LARYNX.*

DR. SAMUEL COHEN, Philadelphia.

Although about twenty-five cases of urticaria of the larynx have been reported in literature, its frequency is far greater than we would be led to believe. It is occasionally seen following the administration of a serum or vaccine. Dr. F. O. Lewis has seen a case following the administration of vaccine for hay-fever. Freudenthal believes that the condition occurs rather frequently. Sequi reports it as occasionally seen following excessive doses of K. I. and gives as the causes injury to the larynx, kidney disease, syphilis, etc. He suggests as treatment opiates and rest, ice or heat appications, and cocain spray in the larynx. Tracheotomy may be necessary, and he suggests the intercricothyroid route. Lederman reports a case of fracture of the larynx and the entrance of air into the tissues of the neck (emphysema) and when this cleared up edema of the larynx was noted.

Dr. B., into whom I had injected 20 c.c. of horse serum, was brought to my office one evening (eight days after the injection) with marked difficulty in breathing. On obtaining a history of previous attacks of urticaria, I assumed that his difficulty in breathing was due to laryngeal urticaria setting in. Adrenalin solution used hyperdermically quickly relieved his laryngeal difficulty, but the following day showed a very profuse and severe case of skin urticaria, his entire body at one time or another was completely covered. This is the usual laryngeal urticaria met with, and seen rather frequently.

The case I wish to report more in detail here, however, is very unusual in that the laryngeal condition existed for six days, a fatal ending having been expected, and then the skin manifestations of urticaria were noted and that very mildly.

I was called in very hurriedly by Dr. A. to see Mrs. A., age 60 years, last New ear's eve, found the patient in bed, mouth open, labored breathing. In attempting to answer questions patient spoke indistinctly and in a whisper. Dr. A. told me she had three physicians before him, and that a fatal end was predicted, but as a last resort another laryngologist was called in. (Tuberculosis of the larynx had been diagnosed.)

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Besides an occasional attack of bronchitis and some of the ordinary ailments of childhood, her previous health has been remarkably good. The present illness began five days ago, breathing becoming gradually worse, and for the past twenty-four hours unable to swallow even liquids. Heart, lungs and kidney reported by the attending physician as normal. My examinaton revealed scalp, eyes, and ears normal. Teeth poorly kept, tongue clean. Soft palate congested, pharynx and peritonsillar structures deep red. Larynx and epiglottis edematous, especially marked on laryngeal surface, both arytenoids markedly edematous, and occasionally a narrow slit could be made out in the anterior segment of the glottis.

Fearing the possible need of an emergency tracheotomy, I admitted the patient at once to the Howard Hospital, service of Dr. G. B. Wood. I suspected a possible suppurative process in larynx or pharynx. Saw the patient at the hospital at 1 a. m. and sprayed her larynx with adrenalin chlorid solution 1/1000; this was followed in a few minutes by a remarkable relief. At 3 a. m. I again sprayed the larynx. The breathing was distinctly easier and she was able to swallow water.

Next morning, Jan. 1, 1924, found the patient cheerful, swelling of the arytenoids distinctly less, and a view of the interior larynx was obtained, and again sprayed the larynx with adrenalin chlorid solution. That evening the patient complained of itching, and examination revealed urticarial wheals over various parts of the body. The hypodermic use of adrenalin m.5, was ordered repeated if necessary. Next day larynx clear, general urticaria gone, but pharynx and peritonsillar tissue still red. This deep congestion was thought by some of my colleagues to be masking pus beneath it in the left pharyngeal wall, and to satisfy ourselves, a knife was inserted and nothing obtained.

This case is of interest for several reasons: *1* Very few cases of laryngeal urticaria have been reported, but I believe it is more frequent than we imagine. *2* Because of the marked beneficial effect obtained by the use of adrenalin chlorid spray in the larynx. *3*, Because of the rarity of an attack of laryngeal urticaria lasting six days and then followed by the skin eruption. *4* Because of the confusion in the diagnosis, as we have here catarrhal process upon which has been superimposed the laryngeal urticaria.

2009 Pine street.

IDIOPATHIC ABSCESS OF THE LARYNX.*

DR. SAMUEL COHEN, Philadelphia.

The condition is of interest because of its infrequence, and its rather high mortality when not incised early.

The first case was reported by Roland in the thirteenth century. Morrel McKenzie in his textbook reports thirteen cases, but cannot demonstrate any local or general cause. All his cases were cured either by spontaneous rupture or the surgeon's knife. Laennec reported two cases, both ending fatally, and on postmortem no cartilaginous involvement could be found. Richards collected twenty-six cases of idiopathic laryngeal abscess, and his paper is most interesting.

Richards' cases range from 9 to 71 years of age. They were most frequent in males than in females. In children he believes the infectious diseases play a causative role. In adults, exposure to cold and wet, he regards as an etiologic factor. Ten of his cases were treated by nonsurgical methods, and all died but one. The balance had operative intervention and almost all recovered. In five cases that ruptured spontaneously, one died and that one had a tracheotomy performed, which was soon followed by bronchopneumonia and death.

Dr. Thomas reports an interesting case of a child, age 3½ years, whose laryngeal abscess was only discovered when a drachm of pus was coughed up after the insertion of an intubation tube, to relieve difficulties in what was thought to be a case of croup. After a very stormy siege the patient recovered.

Dr. McDonald reports the case of a woman, age 40 years, who had a right-sided laryngeal abscess for eighteen months before symptoms warranting incision set in.

The symptoms differ, depending upon whether occurring in a child or in an adult. In children it is ushered in like an attack of croup, only more insidious in onset, gradually developing marked dyspnea, and dysphagia. Expiration is comparatively easy and the cough much less brassy. On attempting the recumbent position an increase in dyspnea is noticed. The condition can most easily be confused with a retropharyngeal abscess. In adults it may be ushered in without any symptom referable to the larynx at all. Dr. Richards reported one case where the patient had a slight dyspnea for two days, which suddenly increased, with the patient's exit that same evening. In

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another one of his cases the patient merely complained of a slight pain in the throat, took a short walk and suddenly died.

Dyspnea was frequent in most of Dr. Richards' cases. Dysphagia in about one-half the cases. Pain occurred even on swallowing saliva. This, McDonald points out as more frequently noted in a laryngeal case than a pharyngeal one. Stridulous breathing and occasionally cyanosis are met with.

Tenderness on slight pressure over the larynx is seen, but an external swelling is rather rare. Occasionally symptoms pointing to the larynx are not complained of at all, and the abscess is found only after careful study or accidentally.

In indirect or direct laryngoscopy a mass is seen. The mass is usually noted at the base of the epiglottis, more to one side. The swelling is usually more hyperemic than the already congested surrounding mucosa. At some point a small yellow spot is often seen denoting purulent secretion attempting to escape. On palpation, by probe or finger, this mass is usually fluctuating.

Cysts may be confused with this condition, but are much paler, far less painful, and much longer duration.

New growths can be differentiated by the general history, site, appearance, probing, etc.

Abscesses due to perichondritis or chondritis will be differentiated by the history of T. B., syphilis, etc.

Treatment as soon as the diagnosis is made, the presence of pus almost certain, incision is immediately indicated.

In children this must be done quickly and carefully. A tracheotomy outfit should always be on hand ready for a possible emergency. After incision, the head should very quickly be brought downward and forward, to prevent the entrance of pus into the larynx. "Watchful waiting" is not the best treatment.

Cold or hot compresses, steam inhalations, purgatives, diuretics and diaphoretics are worthy adjuncts, but not substitutes for the knife.

Mrs. S. W., age 50 years, first complained of a pain in the throat on Aug. 3, 1922. Gradually her throat became clogged until difficulty in breathing set in. I was called in consultation by Dr. G. to the patient's home on Aug. 19, 1922, and found her in a semirecumbent position, with dyspnea a marked symptom.

F. H. negative. P. M. H. had most of the diseases of childhood: ten children, no miscarriages. For the past ten years has been complaining of pains and aches over the entire body.

Examination: A rather stout, middle-aged woman. Heart and lungs were normal. Some fullness and tenderness of the left side of

neck extending to the midline. Teeth, marked pyorrhea. Tongue, center coated white, edges congested. Throat, entire pharynx, soft palate, and tonsillar area deeply congested. Epiglottis deep red in color and thickened; at its base more toward the left side, a swelling is seen about 1 in. in diameter, granular in appearance, and a yellow spot about ½ in. from the epiglottis. Both arytenoids are swollen, the left merges into the mass. The right cord is visible, left not visible, hidden by the mass. A glimpse of the tracheal mucosa shows marked congestion.

While probing the mass the abscess ruptured with hawking up of about a drachm of pus, and with great relief to the patient. Fearing closure and refilling of the abscess, I advised the patient's removal to the hospital for closer observation and treatment, requesting my interne to be in readiness for an emergency tracheotomy. I left town that same evening, leaving my friend Dr. Gleason in charge of the case. He saw the patient that evening and the next day, and reported to me on my return, Monday morning, Aug. 21, by phone, that the patient was doing well. The same day, Aug. 21, 1 p. m., I saw the patient and found she desired more sleep than one would expect, but attributed her sleepiness to the spiritus frumenti she was taking, which was ordered stopped. Report of the urine showed nothing out of the ordinary, no casts, no albumen, no acetone or diacetic acid, and I thought my patient should recover. That same evening I found my patient becoming comatose, and not finding anything in the larynx in explanation, I called Dr. S. A. Loewenberg, who suggested the possibility of it being diabetic coma, and ordered a blood sugar examination (in spite of the negative urinalysis) this was found far in excess of normal. Active treatment for diabetic coma was instituted at once. Next urinalysis report showed the presence of sugar, acetone, and diacetic acid. The patient, however, continued in a state of coma for two days, dying on the evening of Aug. 23, 1922.

This case is of interest because of: *1* Its rarity; *2* the underlying predisposing cause of the abscess was diabetes.

2009 Pine Street.

ACTINOMYCOSIS OF THE TONGUE.*

DR. R. A. BARLOW, Madison, Wisc.

Actinomycosis is frequently encountered in cattle and hogs, and its existence is known to every farmer and dairy man under the name of "lumpy jaw". Man in his closer relationship to animals, especially if he is treating cattle, may develop the disease. Patients who come from dairy and cattle communities should always be regarded as possible victims of the condition.

The tongue is a very rare site of actinomycosis, because it is composed of little cellular tissue on which the ray-fungus grows best, and is protected by a thick epithelial covering. New and Figi, at the Mayo Clinic, reported 107 cases of actinomycosis of the head and neck. In only six of these cases was the tongue primarily involved. The same writers, in reviewing the literature, bring out the fact that previous observers, Illich, Ruhrah, Krymow, and others, had found that out of 1775 cases of actinomycosis there were thirty-five cases primary in the tongue. Grupen reports a case and remarks that 50,000 patients passed through the Kreiskrankenhause before this case was happened upon. The growth was excised, but it was not until the pathologist had made his examination that the diagnosis of actinomycosis was made. This, in view of the fact that the hospital was situated in the midst of an agricultural community makes one suspect that many other cases went by unrecognized. Grupen's case, with others reported in the literature, and my case make a total of forty-three cases. There are many other cases of actinomycosis of the tongue by direct extension.

Bonnet states that the virulence of the fungus decreases in the passage of actinomyocis from animal to man and that it increases again on grains. It has also been noticed that cases of actinomycosis preponderate in sections where the weather is rainy and humid, as dampness seems to favor its development.

Actinomycosis can be found at any time in the beards of grains, and observations of the crypt contents of the tonsils of slaughtered hogs show that the ray-fungus is a constant finding there also.

Many cases of actinomycosis of the tongue in man are associated with the presence of foreign bodies, such as grain beards. Although the disease in man is most commonly found in persons connected with farming and the cattle industry, New reports the case of a judge who was in the habit of chewing grass while playing golf.

The patient usually presents himself because of a swelling or well localized nodule in the tongue. As a rule the condition is of long

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standing, even four or five months; the symptoms are not marked and are not severe. The symptoms of soreness and slight immobility are most noticeable at first, and these increase as the tumor or nodule becomes more prominent. It is from this feeling of stiffness that the name "wooden-tongue" has been derived. Although a few patients complain of intense pain, it is a very rare accompaniment of the condition even on mastication. There is no fever or general impairment of health, and the course of the disease is essentially chronic.

The actinomycotic nodule is usually located well in the anterior portion of the tongue, and the patient can generally recall some injury, either produced by a foreign body or irritation of a ragged tooth. The nodule is indurated and tender, and the mucous membrane is tense over the area much as though it were stretched over a foreign body. Lymphatic enlargement is not characteristic. There is marked irritation in the tissues associated with proliferation of fixed cells. The mass increases in size at the expense of the muscles, which atrophy, and there is a decided increase in rose color of the fibers in proximity to the nodule. The vessels also show evidence of granular degeneration with thickening, and the fibers of muscle tissue in the neighborhood lose their striations.

The abscess itself is cellular and contains some white globules. Centrally may be seen the yellow or so-called sulphur bodies. Occasionally, the nodule will rupture spontaneously and evacuate a foul-smelling, bloody fluid in which may be seen the sulphur bodies.

The salient points in diagnosis are a history of chewing grain beards or grasses, or caring for animals with the disease, a chronic course and lack of general lymphatic involvement. Incision of the nodule and recognition of the sulphur bodies and ray-fungus under the microscope verify the diagnosis.

The treatment which yields best results is a combination of a local surgical measure, that is, incision and drainage, administration of potassium iodid internally, and application of copper sulphate to the incision. In addition, the application of radium to the nodule hastens softening and resolution, and facilitates the elaboration of the potassium iodid. Some English writers advise the use of an organic iodin salt. Potassium iodid has been the standard treatment since Thomassen first used it in 1885. The wound may also be swabbed with silver nitrate solution or the actual lunar caustic bead.

The results of treatment are satisfactory when the disease is recognized before multiple abscesses have developed and when the nodule is not too deeply seated near the base of the tongue. The patient should report for observation at intervals, because there may

be a tendency for recurrence, unless all the pockets in the nodule are clean.

The invasion of the ray-fungus may become very extensive and involve other tissues. The discharge may be aspirated and pulmonary involvement may ensue, which, of course, would alter the prognostic phase of the malady.

REPORT OF CASE.

Case 40748. Mr. F. R. came to the Jackson Clinic, June 18, 1924, and was examined by Dr. J. A. Jackson. The patient was a farmer, age 35 years. The family history was negative and the man himself had been in good health until five months previously. He had first noticed a soreness in the tongue and a nodular swelling on the dorsum at the junction of the anterior and middle third. One month after the appearance of the lump it suddenly ruptured; he expectorated a drahm of foul-smelling material and the tongue felt more normal. In a few days the induration was again noticed, accompanied by difficulty in manipulating food in the mouth. From this time on the nodule increased in size, and about every three or four weeks ruptured spontaneously.

June 19, the nodule was incised and foul, bloody pus containing sulphur bodies was evacuated. Microscopic examination of the exudate revealed the ray-fungus. The patient was given potassium iodid, xv gr., three times daily and copper sulphate, ¼ gr., three times daily. The wound was treated with copper sulphate, silver nitrate solution and caustic bead.

In four weeks the nodule had entirely disappeared and at the last examination, five months later, had not returned.

SUMMARY.

Actinomycosis of the tongue is a condition which is frequently overlooked but whose existence should constantly be suspected in persons who engage in dairy and agricultural pursuits.

Early recognition with surgical drainage and active postoperative care are attended by satisfactory results. Failure to recognize this condition is almost certain to result in most serious consequences, even to the point of jeopardizing the life of the patient.

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THE NECESSITY OF SPEECH AND VOICE RE-EDUCATION, WITH SPECIAL REFERENCE TO NASALITY.

MABEL FARRINGTON GIFFORD, San Francisco.

Speech and voice re-education are as yet in their infancy in the United States. Speech re-education—and by speech we mean the shaping of voice into the consonant and vowel sounds which constitute language—is now being recognized as a necessary adjunct to oral and nasal surgery, especially in Austria. Voice re-education, defining voice as the fabric of which speech is built, that is, sound made by breathing out with the vocal cords so set that they vibrate, is as yet sadly neglected; yet there are various forms of nasality which require the re-education of voice production for their cure.

The subject of nasality has been thoroughly studied by the Germans. The ideas of Dr. Wm. Stern and Dr. Emil Fröschels along this line form the basis of my discussion.

Nasality is a voice defect caused by an abnormal condition or action of the palate, or by an obstruction. In order to make the matter clear let us briefly describe the normal action of the palate in voice formation. In the formation of all sounds of the English language, with the exception only of the nasal sounds m, n and ng, the nasal cavity is separated from the buccal cavity by the elevation of the palate and by the formation of what is known as Passavant's cushion, this latter arising through the contraction of the upper part of the superior pharyngeal muscle and its approximation to the soft palate. Normally this closure is not absolutely air-tight, for the euphony of speech is dependent upon the slight vibration of a current of air in the nose. Every deviation from this palate action, which brings in its train a lack of nasal resonance, causes an abnormal voice condition commonly known as nasality, and which may be divided into three main groups: *1*, open nasality; *2*, closed nasality; *3*, mixed nasality.

Open Nasality: That condition which exists whenever a quantity of air streams into the nose on account of the presence of an abnormal opening (with the exception, of course, of the formation of the nasal sounds m, n and ng) is designated as open nasality. Thus it is caused by a pathological communication between the mouth and the nasal cavity. This pathological communication may exist in the

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region of the hard as well as of the soft palate. An acoustic example of open nasality is the pronunciation of the word "man" as it is done in French.

a. Organic. Open nasality is organic when based upon varyingly severe forms of cleft palate, congenital defects of the palate, perforations of the palate due to lues or tumors, adenoids which hinder the mobility of the palate, or after diphtheria. It may exist through congenital weakness of the articulation muscles, as often found in idiots or imbeciles. Open nasality may be proved if, by alternately holding a patient's nose open or closed while he says "a", there is an appreciable change in tone. There is no change in tone with closed nasality.

b. Congenital. *1* Congenital: no actual paralysis of the velum, but the velum is not used in speech coordination.

2 Acquired: imitation by normal children of the talk of children with cleft palate.

3 Post-operative: cases of injury to the soft parts following adenoid operations. Also cases where patients have forgotten the use of the velum due to pre-operative presence of adenoids with the resulting obstruction. This latter condition may be corrected with exercises.

4 Post-diphtheritic, pseudo-bulbar, paralysis, brain tumors. These cases are those in which paralysis of the palate arises following the diseases mentioned, and where the patient, even after restoration of the velum movement does not use it on account of his nasality habit. Open organic nasality thus becomes open functional nasality.

5 Nasality as found in the hard of hearing also belongs to this group.

Closed Nasality: Closed nasality is a condition brought about by growths in the nasal cavity or in the nasopharynx so that nasal sounds cannot vibrate in the nose. When nasal resonance is lacking (whether in voiced mouth sounds and vowels or in nasal sounds) the resulting speech is "stopped-up" and hollow, or "dead", the stopped-up condition being an indication of what is known as anterior nasality; the dead voice, that of posterior nasality. Thus closed nasality may be divided into:

a, Anterior; b, Posterior; c, Palate.

In closed anterior nasality the site of the obstruction is in the nasal cavity, and the obstruction must be removed by operation. The voice has a hollow sound, and the cause thereof lies in the form of polyps, growths, adenoids, marked deflections of the septum or perhaps only in the presence of a fresh cold.

Examination discloses as a cause for closed posterior nasality the presence of adenoids or polyps or possibly adhesions of the soft palate to the posterior pharyngeal wall. Thus the obstruction in the case of posterior closed nasality lies in the nasopharyngeal space. Operation is indicated for this condition.

Cases of "dead" voice have been found to exist without the presence of obstruction in the nasopharynx. This condition which is called closed palate nasality must then be attributed to a cramp-like action of the soft palate by means of which this latter rises during speech and causes a complete air-tight closure between the nasal and the buccal cavity. We know that resonance and euphony derive their essence from the lack of air-tightness between the two cavities. Impervious closure causes the nasal sounds, m, n and ng also to be formed in the mouth, and as a result m becomes b, n becomes d, ng becomes g. Consequently in cases of "dead" voice the mouth sounds lose their musical quality.

How can we differentiate between these different forms of closed nasality? We must determine whether the defect lies in the nose proper, in the nasopharynx or in the palate. This is no easy matter for the differentiation according to sound is difficult, and the correct group classification should not be considered final until both the nose and the nasopharyngeal space have been examined, and the correct and normal motion of the palate has been ascertained. In cases where there are obstructions both in the anterior and posterior sections, or one or the other condition exists accompanied by the adhesions of the palate to the pharyngeal wall, or possibly where all three conditions exist, it is not possible to make a positive diagnosis. The wisest procedure in such cases is first the surgical removal of the largest obstruction. If after a proper length of time the voice condition is still nasal, the next largest defect must be attacked, and so on until the actual cause or causes are found.

Dr. Fröschels has a method of differentiation between posterior closed nasality due to growths, and palate nasality. He introduces an ear catheter or some similarly shaped sound through the lower nasal passages up to the palate. While the patient is saying the word "name", for instance, he presses down upon the soft palate with the sound. In the cases of posterior closed nasality there is no difference in tone, as the air originally had no trouble in passing the palate, and was not hindered until later in its further passage. This method is valuable as an indication for operation. Operation is only justifiable in cases of growths, etc. Palate nasality requires drill and exercise of the palate.

Mixed Nasality: When along with a pathological communication between mouth and nose (open nasality) there exist equally marked defects in nose and nasopharynx (closed nasality), we have mixed nasality.

a. Anterior. Here we have a stopped-up nose, or an open closure of the velum, as often found in congenital cleft palates. Operation if done must be done with very great care, else the voice is made worse.

b. Posterior. The presence of adenoids, open velum closure are likewise found in congenital cleft palate and congenital defects of the velum. Dr. Gutzmann suggests the removal of adenoids.

Between all these forms there are a number of borderline and mixed forms.

Thus, to recapitulate, the following cases require voice re-education:

Open Nasality: a. organic. Much can be done with speech and voice re-education in cases of cleft palate, congenital defects of the palate, and in certain types of perforations of the palate if the proper dental appliance, consisting of a combination of hard and soft palate, fitted in like a plate, and suited, of course, to the needs of the individual, is used. I have found from my experience that speech re-education is productive of better results in such cases than in cases which have been operated upon. In the case of the dental method of treatment the muscles are more flexible and adjust themselves more freely to the new apparatus. However, in all cases of cleft palate, whether treated operatively or by the dental method suggested, speech re-education is necessary to finish off the treatment.

Congenital weakness of the articulation muscles can be strengthened by exercises, provided that the patient's mentality is sufficiently normal.

b. Functional. *1* Congenital—can be corrected by exercises. *2* Acquired—can be corrected by exercises. *3* Cases where patients have forgotten the use of the velum due to pre-operative presence of adenoids. These patients can be cured by exercises. *4* Paralysis as the result of disease will or will not yield to exercises, depending upon its nature. Complete paralysis, of course, is hopeless, but partial paralysis can be treated and also paralysis which is the result of hysteria, that is, when the psychic factor has been cleared up.

In cases where the soft palate is not used on account of the nasality habit, the palate can regain its activity through exercises.

5 Nasality in the hard of hearing can also be improved through exercises.

Closed Nasality: Posterior functional can be corrected by exercises. Palate nasality can be corrected by exercises.

Mixed Nasality: In anterior mixed nasality, exercises will strengthen the palate.

Closed palate nasality is of special interest to Dr. Fröschels. Five cases are quoted.

1 Young man, age 21 years. Speech poor since eighth year. Nose had been operated upon three times for the removal of growths. The second and third operations had involved much loss of blood and for this reason plans for straightening the septum were not carried out.

Present condition: Patient spoke with a "dead" voice. Nose wide and free. Pressure upon the soft palate lightened the speech. At each opening of the mouth, whether with speech or not, the soft palate raised itself to its limit, so that the patient was not able to breathe through his nose with his mouth open.

Diagnosis: closed palate nasality. Treatment consisted in directions for his imitation of my speech, and in special practice of the nasal sounds, as follows: Dr. Fröschels introduced a gauze sponge into the patient's mouth, which was held wide open. This sponge made the penetration of air into his mouth impossible, so that he was obliged to breathe through his nose while his mouth was open. In that way the patient overcame the cramp-like motion of the palate, which occurred even without speech. Patient left after four months and could speak perfectly normally when he made the effort.

2 Workman, age 51 years. Had always spoken in a nasal tone. Never operated upon. Present condition: "dead" voice. Nose extraordinarily wide, no abnormality. Pressure upon the soft palate brought about normal tone. Diagnosis: closed palate nasality. Patient was not able to devote time to a cure.

3 Girl, age 17 years. Speech always poor. At the age of 5 had had operation for removal of growths from nasopharynx. Present status: "dead" voice. Nose normal. Pressure upon the soft palate produced a clear voice. Diagnosis: closed palate nasality. Therapy as in case No. 1, with a gauze sponge. Patient was cured after three months.

4 Boy, age 6 years. Speech always poor. Hearing poor. Present status: "dead" voice. Large adenoids, catarrh of the Eustachian tubes. Pressure upon the soft palate cleared the voice. Diagnosis: closed palate nasality plus closed posterior nasality. Therapy: removal of adenoids. Speech not improved. Child later given speech re-education lessons, which had been planned from the beginning.

5 Boy, age 15 years. Speech always poor. No operations. Present status: "dead" voice. Very large adenoids, especially to the left. Pressure upon the soft palate improved the voice. Diagnosis and therapy as in case No. 4.

The two last-named cases show a combination of a blocking of the nasopharyngeal space by adenoid growths, and a hyperactivity of the palate. In such cases the growths must be removed before speech re-education can be undertaken, and a cure entails both procedures. This must be made clear to parents in advance. Speech therapy should of course not be started until the patient has thoroughly recovered from the operation. Where there are moderate growths in the nose proper, accompanied by hyperactivity of the soft palate, speech therapy should be tried before operation. In the course of this therapy it can be soon ascertained whether the growths in the nose play a part in the poor speech.

In cases of adenoids or growths in the nasopharynx, operation is necessary because the normal function of the soft palate will never be attained as long as the patient cannot hear the difference between his speech with a contracted and a movable palate. As long as the nose is blocked, the difference in tone or sound between the wrong and the right use of the soft palate will not be heard. Dr. Gutzmann says besides, that adenoids are probably the cause for the hyperactivity of the palate, since the patient does not learn the value of the delicate movements of this organ, speaking as he does with a "stopped-up" nose. Dr. Liebmann says the same.

In regard to therapy in cases of palate nasality, Dr. Fröschels recommends the above exercises of breathing through the nose with the mouth wide open in all cases where the perverse action of the palate occurs when the mouth is opened independent of speech. This condition can be readily ascertained by asking the patient to inhale through the nose with his mouth wide open. If that causes him difficulty, then there is a stoppage causing a closure between the nose and the mouth, which, if there is no other pathology in the nose or in the nasopharynx, must be caused by the soft palate. Aside from the breathing exercises, the practice of nasal sounds can be used advantageously, according to Dr. Gutzmann. Another aid which he has found very worth while, is to practice the vowels with an "h" in front of them. In this way the vowels are pronounced with less pressure; that is, the palate is not so strongly contracted. For it is a matter of fact that the throat is less tense with a voiceless initial letter such as "h" preceding the vowels than if they were pronounced without it. The length of time necessary for treatment depends upon

the individual; however, two to three months at least should be counted upon.

CONCLUSION.

There is no reason why similar treatment for closed palate nasality and for all the enumerated cases calling for speech and voice re-education, should not become the customary thing in the United States. As stated before, cases operated on for adenoids or for cleft palate, where sufficient palate tissue remains for proper functioning to permit of voice and speech re-education, should be finished in this way. Parents as well as the medical profession do not seem to realize the great value, in fact the importance of speech re-education following such operations. Not only is the speech itself unnecessarily ugly without training, but it has its effect upon the future morale of the child, educationally, socially, and psychologically. Many children with neglected speech following operation become the target of ridicule and mimicry of their classmates with the result that their confidence and poise are destroyed and they retire into themselves, withdrawing more and more from society. A speech re-education follow-up would have rounded off an otherwise successful operation.

THE AMERICAN BOARD OF OTOLARYNGOLOGY.

The American Board of Otolaryngology will hold its first examination during the Meeting of the American Medical Association in Atlantic City, May 25 to 28.

According to the rules of the Board, applicants are divided into three classes.

Class I. Those who have practiced Otolaryngology ten years or more.

Class II. Those who have practiced Otolaryngology five years and less than ten years.

Class III. Those who have practiced Otolaryngology less than five years.

The type of examination is different for each class.

The Secretary, Dr. H. W. Loeb, announces that thus far over three hundred applications have been made.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOLOGY.

November 14, 1924.

The Petrous Pyramid; Its Surgical Anatomy and the Technique of the Operation for Its Removal, With Report of Cases. Dr. John D. Richards.

The object of the paper was to present such data as has been secured by operating upon eight cases for the removal of the petrous pyramid, either in whole or in part, and to discuss from a surgical standpoint certain anatomical features of the pyramid having a bearing upon the technique of the operation.

Three of the cases were malignant, having as far as could be determined, the middle ear as the original site of the lesion. These casés contributed no special features to the technique of the operation not embraced in the second group.

The second group consisted of five suppurative cases in which the extensive necrosis of the petrous was consecutive to mastoid and labyrinth suppuration. The outstanding feature in all these suppurative cases was the presence of a collection of pus at the posterior petrous plane, either in the meatus or adjacent to it; in four, the internal meatus was involved; in one it was not. The first case showed conclusively that the abscess may result from direct perforation by a suppurative process of the inner labyrinth wall; the other four pointed to the cochlea as the focus of infection. The anatomical structure and relations of the modiolus were described and its importance as a pathway of infection was stressed; also the effect of respiration upon the fluid column of the cerebrospinal axis in the dissemination of infection from the cochleal to the intracranial cavity, the statement being made that the modiolus, as an average for the distribution of infection to the interior of the skull, is the most important structure of the labyrinth, outranking all others in relation to the surgical anatomy of this region; the cochlea being the great distributing focus. The technique and rationale of the operation were discussed in detail, one of the most important points being to determine whether or not to save a facial arch for the facial nerve, the operation being made much more difficult if this attempt is made. The extent and character of the necrosis decides this question. The technique of any operation for this removal of the petrous pyramid must embrace in its connection something more than the ability of the operator to carve out a facial arch, avoid the internal meatus, and remove such portions of the pyramid as are diseased or dead. It must take into account the structural character of the pyramid, the nutrition of the bone and the nutritional changes which may take place subsequently in portions of healthy bone which are allowed to remain. Considerable emphasis was given to the role of the carotid artery in this operation.

In closing, the writer pointed out that the operation is one of magnitude—many vital structures lie across its path. The structure of the sclerotic portions of the petrous pyramid is treacherous and the bone often fractures in a manner which is incalculable; situations arise to make judgment difficult in the absence of experience. Long training in cadaver work is absolutely essential to the operator. The technique of the operation may vary from that presented in the paper, but enough is known to make the otologist take pride in the fact that it is he who is called upon to perform what is undoubtedly the most highly technical and difficult operation in all surgery.

DISCUSSION.

DR. DENCH: It is always a great pleasure to discuss any paper Dr. Richards may write, for he does his work so thoroughly, is so clear a speaker and so thoroughly a master that there is very little left for

discussion. He sent me a copy of his paper, and I assure you I enjoyed reading it and taking in points which I am very sure you cannot be able to take in thoroughly by listening. His work contrasts very favorably with the presentation by Chipault in his Operative Surgery of the Nervous System, in which he describes the technique for the removal of the petrous pyramid. That was printed in 1894, thirty years ago, and gives a very short but very good resume of the operation, but not so good as that of Dr. Richards.

Taking up a few points,—I was very glad to hear what he said about the undesirability of attempting to preserve the facial ridge in all cases. It is also a pleasure to note that Dr. Kahn, writing some years ago, disregarded it for exactly the same reasons as Dr. Richards has stated, i. e., that it prolongs the operation unduly in critical cases. We must understand that it is necessary in certain conditions to sacrifice the nerve—and the more popular the operation becomes the more lives will be saved. In dealing with desperate cases desperate measures are necessary, and the sooner we as surgeons give the public to understand that a living patient with a destroyed facial nerve is better than a dead patient with an intact nerve, by so much more will be able to benefit these very difficult cases.

In a case of suppurative otitis on which I operated some time ago, in which both pyramids were involved, I had the same experience as Dr. Richards, with a sequestrum on the nerve, and was able to remove this little collar of bone; I had never before seen a little sequestrum which slipped up and down the nerve. The patient had both petrous pyramids involved, and got out with a fairly good face.

In these cases where we know it is very likely that it will be necessary to exenterate the entire pyramid, why would it not be a good thing to tie off the internal carotid as a preliminary procedure? This will control hemorrhage and would be also indicated in cases of malignant growths.

I had a very interesting case with Dr. Abbe, in which the patient suffered from a sarcoma of the pyramid and had a very extensive radical operation. At the close of the operation I wounded the superior petrosal sinus, and said to Dr. Abbe: "We can only graft this cavity partially;" he replied: "I see no contraindication." We then removed the plug over the sinus and substitued one, concluding a Thiersch graft. The graft took perfectly, and the patient presented one of the most perfect graft results I have ever seen. Absolutely no harm came from it. Dr. Abbe said: "What is cleaner than a skin graft? It possesses a certain amount of hemostatic effect. That patient lived five years after the operation and died of apoplexy.

What Dr. Richards said about the modiolus is perfectly true,—of infection due to aspiration. I have also followed his suggestion of taking out the interior of the apix of the pyramid first and pulling out the shell.

My experience differs from his in wounds of the dura. In one case I took out the entire labyrinth and the dura was torn. There was no leakage in that case. The man made a perfect recovery. It would seem that wounds of the dura are sometimes not so serious as we are inclined to think. I believe I am the only man who has had the courage to report a number of cases where the dura was wounded. Accidental fracture of the modiolus is a very serious accident. I have never had it—more perhaps from good luck than good management. Where you have had a sinking of the medulla under the foramen magnum due to loss of cerebrospinal fluid, you can do a salin infusion either into the spinal cord or intravenously. In one case with tremendous headache and all the symptoms of brain pressure following lumbar puncture, I used hypodermoclysis with success.

I wish that Dr. Richards could drum one thing into the mind of everyone—that is, the use of the gouge or chisel in preference to the use of the curette. The gouge or chisel used along the axis of the pyramid is a very safe instrument; the curette is dangerous. In separting the dura from the pyramid, I find that the bulging back of a curette is a very useful instrument to protect the dura. If you use the chisel or gouge

along the axis of the pyramid, separating the dura from the bone with a curette, back turned toward the dura, you are very unlikely to tear the dura.

DR. DUEL: Dr. Richards was kind enough to send his paper to me also, in order that I might have time to study it and formulate a discussion of the subject. I really read it about two hours ago and immediately realized that I should have had two weeks, instead of two hours, in which to arrange an adequate discussion of such a valuable contribution.

Labyrinthine surgery has fascinated me ever since its inception. At the beginning I spent a summer in Germany working over this subject, where the anatomical material was more easily acquired. I returned with many specimens over which I worked for a long period, and supplemented this with a large amount of work on the cadaver. As a result of this effort I am convinced that I shall never have a sufficient amount of labyrinthine surgery to become an authority in the technique. Nevertheless the few cases one sees in a lifetime are liable to be so engrossing, indeed often so dramatic, that one almost unconsciously is impelled by them to discuss the matter with strong conviction. I waited for cases to appear in which the experience I had acquired on the cadaver might be utilized. In the course of nearly twenty years only thirteen cases have come under my own personal management. In addition I have seen a few cases in consultation.

Of my own personal cases six were acute; seven chronic. As the result of this very small experience, I feel convinced that every surgeon should have a well formulated plan with which to deal with his case when it appears. As I read Dr. Richards' paper this afternoon and heard it again tonight, I was struck with the fact that in every labyrinth case on which he was forced to operate it had been necessary to wholly exenterate the labyrinth or remove the entire petrous pyramid. In my own experience, there has been none in which the situation required the complete removal of the petrous pyramid. No matter how much experience one has had: no matter how many different methods one has tried, either on the cadaver on living subject, one is forced into the judgment in the end that it is a difficult matter to completely exenterate the labyrinth: often an impossible matter to completely exenterate it and preserve the facial nerve; and always extremely hazardous to the life of the patient as well when the complete removal of the petrous is attempted.

So my limited experience would lead me to classify these cases into *first*, the *acute type*, in which there is a rapid and complete invasion of the membranous labyrinth with destruction of the function, and impending meningitis. In these a complete exenteration is unnecessary in the best effort to preserve the patient's life. *Second*, the chronic type, in which in order to place the patient in less jeopardy of his life one has to operate, the extent of the operation depending on the condition found. *Third*, a type in which already the destruction is so great, as in several of Dr. Richards' cases that there is no longer any question of preserving any facial function—nothing left but the off chance of saving the patient's life.

A large number of the cases with which we meet are the acute type, in which there has been a sudden destruction of the labyrinth as the result of the extension of the purulent infection from the middle ear, either acute or chronic, with a complete loss of function. In such a case I am convinced that it is much wiser not to operate the labyrinth during this very acute stage, for this reason: the barrier which nature sets up in all chronic cases, and attempts to set up in any acute case, is an effort to wall off infection from the meninges, and the trauma of the operation at this early stage may break down this barrier, thus precipitating the extension of infection which was to be feared. Once the barrier has been erected the labyrinth may be opened and drained with comparative safety, as is done in the chronic cases. In cases where the symptoms have suddenly arisen from a very acute middle ear, there is no probability of necrosis of the bony labyrinth: it is simply a suppuration of the membranous labyrinth, and such lesions in my opinion do not require com-

plete operation. What one is attempting to do in such instances is to drain the labyrinth of an infection which is threatening to provoke a meningitis. Should meningeal symptoms supervene in such a case, the obvious thing to do would be to attempt to arrest the infection. One would be operating not for a labyrinthitis but for a meningitis.

The very important anatomical consideration which Dr. Richards pointed out, viz: that the modiolus when broken off at the base readily allows a free flow of meningeal fluid through it, therefore becomes a useful adjunct. Our object in doing this operation is to secure drainage away from the source of infection. In such a case where meningeal symptoms develop I believe it of distinct advantage to uncap the cochlea, and completely remove the modiolus, thus securing a rapid flow of meningeal fluid. At the same time I would remove the internal plate from the sigmoid sinus well forward to the petrous and at that point again incise the dura. I should also do as Dr. Richards did in his case, make repeated spinal punctures to secure a free flow of the infected meningeal fluid.

I believe I made a mistake in two early acute cases with meningitis in prolonging the operation, in an endeavor to carry out the advocated plan of draining the labyrinth both in front of and behind the facial nerve, leaving a bridge of bone to support the nerve. In later cases I have simply uncapped the cochlea and opened the vestibule; this requires only a few minutes. In one case having an acute labyrinthitis and meningitis I did exactly what Dr. Richards did, by accident fractured the canal and produced a collar of bone around the facial nerve. Although by painstaking effort I succeeded in removing it without severing the nerve, the patient is living, with a permanent facial paralysis. I am almost sorry she did not die.

Whenever an acute labyrinth develops in a chronic suppurative ear, with complete destruction of labyrinthine function I am firmly convinced that it is sound practice to wait for a favorable opportunity to operate. If no meningeal symptoms arise—and there is a good chance that they may not—one can operate such a case at a later time with a much better expectation of life than if one had operated during the acute onset of the labyrinthine symptoms. Of course, if meningeal symptoms should arise one is forced to operate; but there again one is really operating for meningitis rather than for labyrinthitis, and I believe the best effort will be made by endeavoring to drain the meninges in the manner I have just outlined.

There confronts us a third class of cases in which one elects to operate for a chronic suppurative otitis. Functional examination reveals a long standing complete destruction of the labyrinth. In these cases I believe it unwise to attempt a radical operation without at the same time draining the labyrinth. How much drainage of the labyrinth should be done at such a time I think should depend entirely on the condition found at operation. Many are caused by cholesteatoma, and in many of them it is quite evident that there has been an erosion of the horizontal semicircular canal, and that the labyrinth as probably been invaded from that region. In such a case, it seems to me quite important to uncap the cochlea and also to open the vestibule, posterior to the facial nerve as well as anteriorly, leaving a bridge of bone to support the nerve. In such a case, I still think that it is wise, unless there is evidence of necrosis of bone, to content oneself with this procedure rather than make a more elaborate effort. Those of you who have attempted it will understand what I mean when I say that I have discovered no method of cutting down just a certain portion of the modiolus without occasional accident. I find that it is just as easy to fracture it by any method as to preserve it. I bow to Dr. Richards for his skill and shall ask him to show me, and shall try his particular method before saying it cannot be done; but I personally cannot do it, now, with any assurance of success.

So when a barrier has been formed between the meninges and the focus of infection, I prefer to leave nature to do a little of the work, and trust

to that rather than to attempt a manouver which may open up an avenue of infection.

I would like to reiterate Dr. Richards' injunction, to attempt nothing on a patient which you have not repeatedly done on the cadaver. With all the experience in labyrinthine surgery one can acquire, he realizes when doing it on the living subject, that it is most difficult. Whatever one attempts when operating living subject should be done with a definite idea of attack which has been practiced repeatedly on the cadaver. Failures under the circumstances will cause less chagrin.

May I call attention to another point? In my limited experience, of only thirteen cases, not one has ever brought a suggestion of the necessity for removal of the entire petrous. Although I have done this operation many times on the cadaver, if I had to do it on a living subject, I should approach it with much trepidation. I maintain that we should not look forward to labyrinthine cases as ones in which we should probably have to attempt such radical measures, but rather the contrary. I believe that the most conservative operation that one can do, and save a life, is the best in labyrinthine surgery. Dr. Dench has just said "a live patient with a facial paralysis is better than a dead patient with an intact nerve"; but I would rather say that a live patient with an intact facial nerve which is functioning, is much better or than one whose nerve has been ruined by too radical a procedure.

DR. JOHN B. RAE: Like the previous speakers I, too, have had the opportunity of seeing Dr. Richards paper. It seems to me that while there is much to study there is little really to discuss.

Dr. Richards makes brief mention of the fact that it is only a few years since otologists were discussing the advisability of routine exploration of the tip of the mastoid in acute cases. The paper tonight proposes in certain cases and under certain indications to continue exploration to the tip of the petrous. Between these two limits the advances in operative procedure have been made step by step. One must be struck by the realization that each step has been characterized by an increased familiarity with the minute antomy, a clearer understanding of the surgical pathology and an improved technique. These three requirements are fundamental and are all squarely met and fulfilled in the presentation made by Dr. Richards.

I am specially impressed with the importance of the technique in these cases. Attempt is made to eradicate disease to its limit so as to save life while at the same time every effort is made to preserve the facial nerve. In malignant cases this may be impossible and the nerve should then be sacrificed, provided that patient and relatives have entire knowledge of the possibilities and impossibilities of the surgical measures undertaken.

In suppurative cases the indications may not be so evident and the amount and character of the surgery attempted will be determined by the judgment and skill of the individual operator. In any case I am very deeply impressed with the need of purely technical training and can only repeat what the other speakers have said, that these operations should only be undertaken after long and constant practice on the cadaver.

Among the interesting observations made by Dr. Richards is that regarding the laminated structure of the pyramid with a similar arrangement of nutritional vessels aptly described by him as "nutritional planes". This may well repay study as it may explain the occurrence of post-operative sequestra.

In conclusion I congratulate Dr. Richards because in this paper he has made a real contribution to otology.

DR. RICHARDS, closing the discussion, said he appreciated the manner in which the paper had been received, and thanked the gentlemen of the Section for their discussion. In the malignant cases it is essential that a complete exenteration be done and that we make no attempt to save any of the petrosus structure. We cannot be conservative.

As to the cases of suppurative origin, he had seen only five cases in an experience of about twenty-two years. It is not surprising that we do not see more. These extensive cases of necrosis in which the disease extends

far beyond the confines of the labyrinth out into the body and the apex of the petrous will not be saved by a labyrinth operation; in fact, the labyrinth operation is but one step in the operation under discussion. We are confronted by extensive necrosis, and must be prepared to remove it, no matter where it leads.

As to whether or not a facial arch can be saved, that depends upon the extent and location of the necrosis. If we can save an arch for the facial nerve, we should do so; however, in a highly pneumatic bone, we run the risk of having the arch die subsequently from malnutrition, even though the bone is healthy at the time of operation; in this type of bone Dr. Richards thinks it wiser to make no attempt to save an arch, but to abandon the facial nerve to an environment of blood clots and scar tissues.

DR. JOHN R. PAGE: I also had the privilege of reading Dr. Richards' paper, and he has well said it is an operation of great magnitude.

It is, and rightfully should be, appalling to any but one whose temerity is born of the most careful study, experience and technical skill. One of less experience need never be too proud to back out of such a situation and postpone further necessary work until he can obtain assistance from one more experienced.

The difficulties are at a depth unfamiliar to most of us. I have never had occasion to follow infection beyond the labyrinth except in one case, which Dr. Richards will recall, in which I explored beyond, but in front of the labyrinth along the carotid canal. Fortunately such cases are not often met with, but any of us may stumble on one, and for that reason I shall strive to remember in detail the steps of the operation and the technical and anatomical difficulties in the different types of bone as Dr. Richards presents them.

The effect of respiration on the cerebrospinal fluid I recall having read of in MacEwen's book, but the practical importance of it had lapsed in my memory. I am glad to be reminded of it. The recovery of the case with streptococci in the cerebrospinal fluid is an occurrence that I also have read about, but have never seen.

Of all the difficulties so graphically described, the greatest to me is that of having to decide in a certain type of case to deliberately sacrifice a living facial nerve in order to properly complete the operation. In such a case I believe I should return the patient to bed with an unparalyzed face and an uncompleted operation rather than assume that responsibility. A great deal can be done in time to necrotic bone through an open wound with a mild solvent solution, such as Carrel-Dakin's hypochlorite solution.

In this respect the reference to the mastoid tip does not to my mind strengthen the contention. I do not, as I formerly did, invariably remove the whole tip. I do remove the cells from the tip but not infrequently leave a good portion of the outer plate of the tip to which there is muscular attachment.

The sharp edges are removed but there often still remains considerable of the cup-shaped outer plate and I have never seen necrosis of this occur. The Boston men, I believe, follow this method almost entirely.

This is a valuable contribution because it comes from a skillful surgeon and the most accurate minute and unbiased observer of my acquaintance.

DR. ALFRED KAHN: I have not had the opportunity like the other gentlemen of reading Dr. Richards' paper, but it has been a great pleasure to have had the opportunity of listening to it. Dr. Dench referred to the case which I reported in 1918, and to my paper wherein I recommended the severing of the facial nerve, stating that it was better to have a severed nerve and a live patient rather than a nonsevered nerve and a dead patient. The case that I reported had had a previous incomplete radical operation that had been done by another surgeon before he came under my observation. I operated further, completing the radical operation. The patient developed a meningitis and became unconscious; and there was a discharge of cerebrospinal fluid for quite a time. It was possible to explore through the promontory with a probe, as through the action of

disease a large fistulous tract had developed, destroying the bone down to the brain covering. We thought that this patient would surely die. He, however, recovered. With the knowledge gained from this case it occurred to me that an imitation of the action of nature in this patient would be a good surgical procedure, especially for draining infection in the region of the internal auditory meatus.

When I first began the study of otology there was an element of anxiety whenever the dura was exposed at an operation. I remember again, the fear of skin grafting over the dura; and now the bugbear of otology is opening the subdural space. In the *Medical Record* of Nov. 30, 1918, and THE LARYNGOSCOPE about the same date I described an operation wherein the facial nerve was destroyed and a large area of soft tissues was exposed. My reason for doing such a radical procedure (drainage) was therein described. At that time it occurred to me that surgery of the ear would advance along lines described tonight.

DR. PHILIP D. KERRISON: Dealing, as it does, not only with a somewhat rare pathologic condition and its surgical treatment, but also with the structure and the blood supply of the petrous bone, Dr. Richards' paper could be adequately discussed only after careful reading. Dr. Richards has said nothing of any clinical phenomena which may characterize the spread of an infection from the labyrinth throughout the petrous pyramid, and his description of the pathologic changes found before and during operation has of necessity been brief.

With regard to the practical deductions to be drawn, two questions would necessarily come up for discussion: 1 What, precisely, are the indications for such an extensive operation; and 2 the question of prospective average results without operation. In other words, the risks inherent in the lesion should be considered only in relation to the risks inherent in the operation itself. Among the latter, according to Dr. Richards, must be included in many cases the voluntary and permanent sacrifice of the facial nerve.

Dr. Richard's brilliant paper covers many phases of the subject of suppurative disease of the petrous bone, and constitutes a mine of facts from which we may draw much useful information.

DR. RICHARD (closing): I appreciate the manner in which this paper has been received and wish to thank the gentlemen of the Section for their discussion. In the malignant cases it is essential that a complete exenteration should be done and that we make no attempt to save any of the petrous structure—we cannot be conservative.

As to the cases of suppurative origin: I have seen only five cases in an experience of about twenty-two years. It is surprising that we do not see more. These extensive cases of necrosis in which the disease extends far beyond the confines of the labyrinth out into the body and the apex of the petrous will not be saved by a labyrinth operation; in fact, the labyrinth operation is but one step in the operation under discussion; we are confronted by extensive necrosis and must be prepared to remove it no matter where it leads.

As to whether or not a special arch can be saved, depends upon the extent and location of the necrosis. If we can save an arch for the facial nerve, I think we should do so; however, in a highly pneumatic bone we run the risk of having the arch die subsequently from malnutrition, even though the bone is healthy at the time of operation; in this type of bone I think it is wiser to make no attempt to save an arch but to abandon the facial nerve to an environment of blood clot and scar tissue.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

November 19, 1924.

The Management of Asthma. Dr. Maximilian A. Ramirez.

1. *Introduction.* I am not going to read a carefully prepared paper reviewing literature with which you are all thoroughly familiar, nor am I going to enter into a discussion of the various theories of anaphylaxis

and allergy. I shall attempt to present to you in a brief and concise manner the practical management of asthma.

2. *Types of asthma.* There are various types of asthma, and these may best be classified or grouped into those caused by specific proteins and those that are not caused by proteins. The group caused by proteins may be called True Specific Asthma, Allergic Asthma or Protein Asthma, and the causative protein may be either animal, food, pollen, possibly bacterial, or a combination. This type of asthma should be further subdivided, clinically, into those cases giving a positive skin reaction and those not giving a skin reaction to the proteins tested; it is well to remember that many cases of true specific protein asthma give a completely negative protein test, due to the fact that either the offending protein has been omitted from the list used in testing, or else the patient is in an antianaphylactic or antiallergic state and does not show a skin reaction to proteins to which he is really sensitive.

The other group, where symptoms are not caused by hypersusceptibility to specific proteins, forms the majority of all cases examined. I should say that between 65 and 75 per cent of the cases do not give skin reactions to proteins, nor do they give the history suggestive of allergic asthma. This type could be called nonspecific, nonallergic, or nonprotein asthma, and as it is almost always associated with a chronic bronchitis, could also be termed asthmatic bronchitis. This group is not caused by proteins, and must not be confused with the group previously mentioned where from one cause or another, negative skin tests were obtained in cases that are truly sensitive. It is particularly in this non-specific group that we find pathological conditions in the nose, throat and accessory sinuses as an important underlying or contributory factor. Diseased tonsils quite frequently are responsible for a persistent asthma. Disease in the nose and sinuses is such a common finding in asthma, that too much importance cannot be attached to this particular phase of the disease. There is no specific, nasal lesion. One case will have nasal polypi, another infected antra, another chronic ethmoiditis, and most cases have a combination of conditions. Every case of asthma should be carefully examined by a competent rhino-laryngologist. It is essential that every focus of infection in the nose and throat be *completely* eliminated, as it is practically impossible to obtain a satisfactory result in the vast majority of cases unless this is done, and unless removal of a focus is thorough, you are apt to have recurrence of symptoms in cases where a permanent cure could have been effected. Occasionally you will see a case sensitive to some specific protein, who will recover on elimination of this protein, in spite of a badly infected nose, but this is *not* the rule and most cases whether specific or nonspecific will have persistent symptoms and frequent relapses as long as there is definite infection in the nose, sinuses, or tonsils, even after removing the reacting protein.

However, I should like to caution against too much optimism, for a great many cases of asthma have extensive nose and throat operations without relief. And many cases have nose and throat operations for the relief of symptoms that are truly due to a specific protein, and will not improve until this substance, whether it is a pollen, animal emanation or food, is found and completely eliminated.

I think it well to make note at this time of the fact that many patients have an antrum full of pus without symptoms favorable to the sinuses, as they may also have chronic ethmoiditis or infected tonsils without local symptoms, and still these conditions be responsible for constitutional disturbances. I realize that this is a well recognized fact among rhinologists *but it is often* overlooked by the internist.

Just what causes the asthmatic symptoms in this group, where symptoms are due to pathological conditions in the nose and throat, is a question. Whether patients become sensitive to bacterial proteins retained in the nose, sinuses, or tonsils, whether paroxysms are due to action on the bronchial musculature by toxins, or to local action on the bronchial mucosa by pus and other secretion draining directly into the larynx and

bronchi or whether symptoms are a reflex due to a direct action on nerve endings in the nose, I do not know.

There is also a large group of cases that are comparatively free of bronchitis between attacks and may, or may not, have an associated nasopharyngeal condition, that I think are due to a *sympathetic-clonia*. This really constitutes a distinct clinical entity and should not be discussed as a type of asthma. However, as this is merely my own personal impression, I sha'nt give it unmerited emphasis, but shall discuss it in more detail, not, as a distinct entity, but as a type of asthma of extrinsic non-protein origin.

In addition to the types already mentioned, there is still another group which I think is due to hypersusceptibility to a nonspecific protein radicle. These cases have definite, recurrent paroxysms of dyspnea, are free of associated bronchitis and are absolutely free of symptoms between attacks, but they do not give skin reactions to the various proteins used in testing. This class could be termed nonspecific protein asthma or nonspecific allergic asthma, and is the type that responds most satisfactorily to injections of nonspecific protein solutions.

The type of asthma classified as specific protein or allergic, which is due to hypersusceptibility to proteins and gives as a rule a positive skin test, may be caused, as previously mentioned, by food, animal or pollen protein or a combination. Of the foods, wheat, milk and eggs are very important, though any food may be the cause. Of the animal emanations, horse dandruff and goose feathers are probably the most common, though dog hair, cat hair and rabbit hair are not uncommon. Of the pollens, timothy and ragweed are the most frequent offenders.

However, every case tested should be very thoroughly tested, and every case of suspected asthma should be tested; as this is the only way of properly classifying the case.

Nonallergic asthma with a constant, associated bronchitis is usually bacterial in origin and the organism or group of organisms can usually be isolated from the sputum.

The so-called bronchial sympathetic-clonia cases are probably the result of intestinal absorption and a coincident endocrine dysfunction. Practically every one of these cases have intestinal stasis; either high or low blood pressure, usually low; either high or subnormal metabolism, more frequently low. In passing, I shall say that a large series of blood chemistry observations showed nothing of definite value. The plasma chlorids seemed rather constantly higher than normal, and in the nonspecific type, the blood sugar was moderately increased.

3. Treatment. The treatment of asthma naturally resolves itself into the treatment of the various types as well as treatment during and between attacks.

The treatment of the specific protein or truly allergic cases consists in completely eliminating the offending protein, and in then attempting to actually immunize the patient by injections of increasing doses of the specific protein to which they are sensitive. The result of treatment in this type is fairly successful. Patients sensitive to a specific protein or group of proteins usually improve very rapidly if the offending proteins are eliminated. However, the permanency of active immunization is another question and one about which I have grave doubt. I feel that active immunization against animal emanations, as, against the pollens, lasts a variable time and must be repeated. Immunization against foods is more lasting. I do not know that this is a generally accepted conclusion, but it is my impression from a rather large number of cases carefully observed.

The treatment of the nonspecific or nonallergic cases is that of chronic bronchitis. Medicated inhalations, sodium iodid intravenously, vaccine either autogenous or stock, various expectorant mixtures, etc. The result of treatment in this type of case is not so satisfactory as it occurs more frequently in older patients, the terminal bronchi are usually dilated, and there is a good deal of emphysema and increase in peribronchial fibrous tissue.

The nonspecific protein cases are treated by injections of nonspecific protein solutions such as peptone, milk or large doses of mixed vaccines. These cases also are quite resistent to treatment.

The sympathetic-clonia cases are great benefited by duodenal lavages, colonic irrigations, intravenous injections of calcium chlorid, and proper gland therapy. The result of treatment in this group is quite satisfactory. Patients improve readily though they have to continue treatment for some time.

Treatment of diseased condition in the nose and throat is, of course, necessary in all types of asthma, and for purposes of emphasis. I should like to repeat that it is most important, to thoroughly and completely eliminate foci of infection and absorption, not only from the nose and throat, but any focus of infection in every case of asthma. A true specific case, giving a positive skin test to various proteins, may continue having frequent paroxysms until an infected sinus or an infected gall bladder is properly drained, or a pus tube removed; on the other hand, it is also well to remember that the finding of definite foci of infection, such as infected tonsils, polypi, infected gall bladder, etc., does not necessarily mean that they are in any way responsible for the asthmatic symptoms, and though they should most certainly be treated and completely eliminated, the patients must not be told that their asthma will be cured, for we all see any number of asthmatics that have been operated for one thing or another with definite promise of cure in whom no relief from paroxysms was obtained.

I should also like to say a word about the use of the bronchoscope in asthma. I think that in the nonspecific cases, particularly if they are not of terribly long standing, you get quite a bit of relief following local application to the lower part of the treachea and primary bronchi of a solution of adrenalin and silver nitrate. In long standing cases with a great deal of peribronchial thickening, emphysema and stricture of the terminal bronchi, the results are not satisfactory and the relief from symptoms is of short duration.

Now, just one word about the choice of vaccine. There is a good deal of question as to the comparative value of stock and autogenous preparations. Personally, I prefer a freshly prepared mixed stock vaccine, but I do not feel that we can for many very definite conclusion for we con stantly see cases that do not improve while on an autogenous, and seem to improve on changing to a stock vaccine, and on the other hand, we also see cases that do much better on an autogenous than on a stock.

DISCUSSION.

DR. T. J. HARRIS said that the members of the Section owed a debt of gratitude to Dr. Ramirez for his very clear exposition of a subject, which, for those working in a special field came with a good deal of force, since it embodied the views of others who were working on the same subject as internists. It was interesting to know how a subject like asthma was still before those who are studying to determine its cause and treatment. Looking over the literature a few days ago, he had found that the references to the subject for the last two months were just as numerous as they were when he had been looking into the subject some fifteen or twenty years ago. That means that the cause of asthma has not yet been found, nor a sovereign treatment discovered. The classification given by Dr. Ramirez with what he had presented of his views, particularly in regard to the protein form of asthma—what had been said in regard to the intestinal condition and in regard to the nose and throat, would, to a large degree, be agreed to by most. It was a conservative and very judicious presentation of the subject.

It remained for the nose and throat men to speak of their own experience. Special reference had been made to the relationship of the nose to what is spoken of as asthma. The oldest surviving member of the Section was the first to come forward with the view that the nose was the cause of asthma. In 1884-85, Dr. Bosworth made the statement in his well known book on the nose and throat, that he believed that the nose was involved in every case of asthma. He investigated over eighty cases and

thought he had shown by the returns that his position was sound. Based on that investigation, he made the recommendation that every case should receive careful nasal treatment, and he believed they would be cured. It is a long time since then, and we have gone a long way from that position. Recently Dr. Schamberg made a statement with which probably all would agree, that we rhinologists have allowed the impression to go forth that nasal treatment is a sure cure for asthma, and that numerous operations have been done on the nose which were unjustified and produced no results.

Dr. Harris said that the essayist was very sound, and he agreed with the conclusions that in many cases the nose can be involved without asthma being the result, and that in many cases work on the nose was done without producing the desired result. He had been interested in the statistics that in 65 or 75 per cent of cases representing the non-specific group the larger number have involvement of the nose. In a recently published paper, a Chicago man claimed to have presented a new and successful treatment for asthma, and this method revolves around the view that in every case of asthma there is a hypersensitive ethmoidal region in connection with a disturbed nervous system; and brings out the view—with which Dr. Harris agrees—that for the most part asthma is a toxic condition; but when he goes so far as to make the statement that every case of asthma can be cured by proper treatment, he goes further than most men would attempt.

Dr. Harris said that his own views were very much in line with those of the essayist. He knows of cases that have been very much helped by operative work on the nose, but on the other hand, any such statement as that all cases of bronchial asthma show involvement of the nose, is not true. In case after case he has never been able to find any gross pathology in the nose. Like other conditions in rhinology, it means that if one well known specialist makes a statement, and another equally competent man makes another statement, it would only prove that the work and technique of one was not so thorough and searching as that of the other, and that the latter found the source of the trouble and relieved it. If it was only one who agreed to that conclusion, it would be different, but Dr. Harris said he was confident that his own experience was that of the majority. Dr. Harris said he was convinced that many of those in the audience whom he had known for years had tried and been disappointed in many cases where the most careful and painstaking surgery on the nose had been done without relieving the asthmatic conditions. Of course in cases filled with polyps, etc., the removal gave relief; but in many of the cases that condition is not present, the antrum is not filled with pus and there is not a sinusitis. Any sweeping statement that the nose is the source of the trouble and that to relieve a hypersensitive area would cure the asthma, is going too far. It would be very gratifying to have someone truthfully say that his experience showed 100 per cent of cures in the cases referred, but it would be most surprising.

Unfortunately, the essayist's conclusions were not very encouraging, when he stated that the protein treatment is not lasting—and that there is only a toxemia which is commonly relieved. When he spoke of the relief obtained by taking care of the intestinal canal, it was in line with Dr. Harris' own view, that if the toxemia is relieved the more certain we are of relieving the condition in the bronchi.

Finally, referring to the work that Dr. Freudenthal has been so much interested in, Dr. Harris said that here, again, his experience had not been that of Dr. Freudenthal. He had followed that work carefully, but his own experience had not been very encouraging.

Withal, however, he agreed with what the essayist had said: that where there is manifest pathology in the nose, it must be relieved, and because it is so common, a cursory examination is all too little to give, and that when a case is referred to a rhinologist he should not and must

not stop short of exhausting every means for relief and that might discover the condition in the chest.

DR. E. ROSS FAULKNER said that Dr. Ramirez had made a very fine and concise statement about the present status of our knowledge of asthma. That topic always made him think of the old dictum of the professor who spoke of skin diseases—that there was one kind that arsenic would cure, another than mercury would cure, and another kind that the devil himself could not cure. That pretty much described asthma. Dr. Faulkner said that he himself had not had much experience with the specific protein type of asthma; perhaps that used to be operated on unnecessarily more frequently than is done today. In recalling numerous cases that he had operated on it would be difficult to say what the results were, after all; for when it comes to the operative treatment of the nasal sinuses one has the most difficult field in the human body; you may think you have eradicated the whole focus of infection, and yet the condition will not be relieved; unless you eradicate the entire nasal focus, you will get no lasting result. The best results he had ever obtained on asthmatics had been in cases where he had been most radical. Last June he treated a young boy who had been troubled with asthma for two years and could do nothing. His nose was a mass of polyps in the ethmoid region, and both antra were filled up. After an intranasal operation, he was greatly improved; they usually are. Then he came back and a radical sinus operation was performed, and he improved for a time, then relapsed again; he then had some bad teeth taken out; one antrum was cleaned up at that time. The other antrum has had intranasal drainage but if there is any return of symptoms a radical operation will have to be done. The boy has been practically well ever since; he has been comfortable and has gone back to work.

Some cases operated on were much improved but still have slight attacks of asthma; but the more radical the operation, the more completely the focus of infection was removed, the better the result; and many were practically cured. One of the first cases that he had operated on remained well for four years and then relapsed. During that period the patient had no symptoms of asthma. Finally a protein sensitization test was made and she was found to be sensitive to various proteins, and was given inoculation; she was also given colon irrigation, but that did not improve her very much. On looking into the nose some granulations and adhesions were noted and after removing the adhesions her asthma again disappeared. It seemed probable that they were the type that Dr. Ramirez spoke of as due to protein radical. It is a poor thing to reason by analogy, but in the causation of migraine and many other diseases there are two factors: there is a sensitization produced by absorptions from the intestinal tract, and an exciting focus somewhere else. This exciting focus is often in the nose, in cases of asthma, and removing that will relieve the symptoms.

In the case of the sister of a physician, a simple submucous resection was done and her asthma was relieved. That was a case in which there was mechanical pressure in the nose as an exciting cause.

So many remedies have been advocated that it is a good thing that rhinologists are getting their knowledge on a more definite basis. These cases can now be tested for protein sensitization with fairly definite tests. Some recent work has been done in St. Luke's Hospital for bacterial sensitizations, and it seems as if more definite results will be attained by working along this line. The organisms have been isolated, and a skin test made to learn which organism is producing the sensitization. A vaccine is then made and very excellent results have been reported.

Referring to various curative agents, the new quartz lamp has been claimed as a cure for asthma, but in Dr. Faulkner's case did not believe it had been very successful. The rationale has been explained as that it causes the fixation of the calcium treatment, assuming that most of these cases have a low calcium content—but he had not been able to follow that reasoning.

He wished to tell of one very curious case of asthma that has been referred to him by a physician who had referred a number of these cases to the Clinic; this doctor said that the patient required operation; that the man had asthma every year and nearly died of it, that he had a bad nose and should be operated on. Examination failed to show any bad condition in the nose. He was employed in the fur business, and on inquiring if he had the asthma every year at the same time, the man said yes, and that his wife had the foolish notion that it had something to do with furs—one particular kind, he was always sorting cat furs at that time. He was then told that his wife was probably right. Had it been years ago, in the days that Dr. Harris had referred to, when rhinologists thought that all asthma was due to some condition of the nose, an operation would probably have been done.

He then told of another case that had been treated by a house surgeon who was a very devoted follower of Dr. Sluder. The patient had come to the Clinic with a very severe attack of asthma. He had cocainized the sphenopalatine ganglia on both sides, and she was immediately relieved. She said she had never had anything relieve her so quickly before, except a very large dose of adrenalin. It was probably due to the absorption of cocain. Incidentally a very good ethmoidal operation had been done.

Dr. Faulkner closed by reiterating that it was very gratifying to feel that a more definite status is being established in our our knowledge of this very troublesome disease.

Dr. Marvin Jones said he had been asked to speak on the chlorin aspect, but that he wished first to say a few words about something in Dr. Ramirez' paper which appealed to him as being important. In hayfever conditions large, pale turbinate had been found which secreted large amounts of mucus. In the asthmatic cases the opposite condition was the rule, the membranes being dry, red and lustreless, usually an atrophic condition was present. He said he had considered for some time the possible effect on the sympathetic nervous system which would produce the results found in the allergy cases.

We have various chemicals and micro-organisms which will produce a hypersensitive sympathetic system; is it not then feasible to suppose that the reaction to certain irritants is merely an indication of reduced resistance and that we are dealing with symptoms rather than the true cause?

Referring to the chlorin treatment, Dr. Jones said that he had had experience with 300 cases. Included in this number were five cases of asthmatics. The cases of asthma were made very much worse and there was some difficulty in bringing them back to normal. There were a few tuberculous cases and they complained of discomfort following the treatment. The acute rhinitis and acute laryngitis cases seemed to receive some benefit, but it was questionable whether it was any more beneficial than has been obtained by medication now used in office work. In the chronic cases there was no lasting benefit. The point where the bacteria were killed was too concentrated to be easily tolerated by the patient except under very favorable atmospheric conditions. While .02 mg. per liter is easily tolerated on favorable days, it is not tolerated as a general rule.

Dr. Harris A. Houghton: The opportunity to hear a careful digest of the large experience of Dr. Ramirez in the study and treatment of bronchial asthma has been a pleasure. It has contributed much to my knowledge of the subject as much satisfaction in knowing that the fate of these unfortunate sufferers may be softened with greater certainty than at any previous time. The problem also affects the metabolist. Dr. Ramirez touched upon this in saying that in a large series of blood chemistry examinations, nothing which can be claimed to be exclusively characteristic of asthma, was shown. He noted that the plasma chlorids seem constantly higher than normal, and in the nonspecific types, the blood sugar is often moderately increased.

The number of asthmatics who have been examined by methods usual in the practice of blood chemistry in my series, is not large enough to warrant any fixed generalization. What I have to say must be taken in a suggestive way, but it appears that the evidence is sufficiently convincing to say that there is a malmetabolism which fits into the clinical picture of bronchial asthma, and that if taken account of, the percentage of relieved cases will materially increase.

It is almost a truism that any patient suffering from bronchial asthma for a long time will develop focal infections of the nose and throat, assuming that the primary cause, the initial hypersensitiveness, is not due to a prior infection. In the latter instance, we must conceive of a medical history which starts with the infection itself. Such patients belong in the category of so-called bacterial protein sensitization. In both classes, a certain modicum of success has been achieved from nose and throat surgery. The same surgical procedures, yielding good results in some cases, lamentably fail in others. I congratulate Dr. Ramirez on his emphasis of the point that foci of infection must be completely removed. In watching competent rhinologists work, I am satisfied that a determined attempt should be made but in some cases at least it cannot be done. This fact may account for failure in the use of bacterial vaccines, the original focus having been either overlooked or been incompletely removed. Surely, we would not expect a vaccine to relieve when the original focus is still present. Those who practice nose and throat surgery are often up against anatomical deviations from the normal, both in diagnosis and treatment, which preclude success.

Assuming, then, that bacterial infections are the primary cause, or better, perhaps, the determining cause of bronchial asthma in some cases, the sensitization being that of bacterial proteins, and that bacterial invasion of the hypersensitive mucous membrane is always secondarily present in the nonbacterial protein sensitization types, we must be prepared to recognize the evidence of these infections in the field of metabolism. For that purpose, it would be better to give a description of what has been found in one case of bronchial asthma, as typifying many others which have come under observation.

The patient was Mrs. E., about 56 or 57 years of age. Early life was characterized by the usual history of scarlet fever, with subsequent recurrent attacks of sore throat until of age. In latter years, she has had two or three attacks of grip. She has had bronchial asthma for many years, of the nonseasonal type, and usually determined by an attack of "cold in the nose". The weather has more to do with the onset than any other known factor. For the past two years, her asthma has been almost constant. There have been few nights when she has slept without interruption or could sleep with low head. She came under my observation in June, 1924, and on the primary examination showed all the characteristic signs of asthma. The heart muscle was somewhat degenerated. The blood pressure was 180/85 m.m. The fact that two years before she had been pretty thoroughly gone over in the matter of skin tests with results uniformly negative, and that the tonsils were obviously infected, led me to believe that it was a case of nonspecific, bacterial protein sensitization. I urged, of course, thorough surgery on the nose and throat, but the suggestion was waved aside, and I was driven to see what could be done working by the usual methods of the metabolist.

The chemical examination of the blood yielded the following result, the examination being made on June 5. The technique employed follows: two glasses of water were taken, one and one-half hours before examination. The urinary bladder was emptied an hour prior to withdrawal of the blood, and thus to work out the Van Slyke coefficients, we had the withdrawn blood and the one hour's collection of urine.

Weight: 55 kilos. Red cell volume: 41 per cent (normal, 37-45 per cent). Passed in 60 minutes, 275 c.c. urine, equivalent to 6,600 c.c. in 24 hours (normal rate, 1,000 c.c. to 2,500 c.c. per 24 hours).

(All substances in the blood are expressed as milligrams per 100 c.c. plasma; in urine as per cent. Figures used in calculating the coefficients are expressed in grams per liter.)

For purposes of comparison, the figures which developed from an examination on June 25, following twenty days of careful dieting, are given in parenthesis. Abnormal figures are given in black type.

	Blood Plasma		Urine	Van Slyke's Coefficients	
	Patient's	Normal	Concentration	Daily Output	Patient's Normal
Urea	**29.5** (17.5)	12.-24.	.261 (.27)	17.2 (6.5)	**3.5** (3.2) 4.5-10.5
Uric Acid	**4.8** (2.6)	.5-2.0	.0102(.015)	1.67(0.36)	**0.85**(1.2) 1.5-4.0
Creatinin	1.0 (0.9)	.3-1.2	.016 (.039)	1.07(0.94)	**6.5** (9.0) 8.0-25
Sugar	**310.0** (130.)	80.-120.	.73 (0.44)	**17.52**(1.07)	0.95(0.7) 0.5-1.5
Chlorids	**615.** (594.)	520.-595.	.17 (.081)	11.2 (1.94)	
Chlorids calculated:	587 (571)				

Ambard's	Threshold
Patient's	Normal
590 (585)	562

Carbon dioxid absorption capacity of the blood plasma, 61 per cent. Normal, 53 per cent and above.

Daily output of ammonia in urine, 1.07 gr. (.38 gr.). Urine: Specific gravity, 1.011 (1.003). Albumen, very faint trace (very faint trace). Casts not found in either specimen.

Now, as to the interpretation of this blood chemical picture. The first examination indicated a marked functional incapacity of the kidney for the end-products of nitrogenous metabolism. The retention, with the single exception of creatinin, was marked—not excessive. The examination also confirmed the statement of Dr. Ramirez in that there was a heavy retention of chlorids and the blood sugar was high. As to the former, it also confirms the usually accepted fact that in all but 20 per cent of high blood pressure cases, the chlorids of the plasma are increased.

The figures also disclose the fact that the patient is a true diabetic, in this instance to be expected, for the condition is a characteristic of the family. After twenty days dieting, another blood examination was done, and the results are in the parentheses. The improvement speaks for itself. The dietary was low in sodium chlorid, as shown by the daily output of the second examination compared with the first (1.94 to 11.2). Sugar was excluded and carbohydrates were used in such form as to be low in concentration. The nitrogen intake was also much reduced as shown by comparison of the two examinations in urea output per day.

Much more could be gotten out of these two examinations, but the above will suffice for our purposes. Leaving out of the question the high sugar content of the plasma, we have here a picture which is not characteristic of asthma *per se*, though found in most cases of long standing. From long experience, we do regard this picture as one characteristic of chronic, long standing focal sepsis, possibly initiated by some acute infection, such as scarlet fever. The figures indicate marked kidney incapacity for the excretion of the substances mentioned. The medical history of this patient probably followed that of others in that, the first effect of this type of irritation, usually of bacterial origin, curtails the functional capacity for excretion of salt; then follows a "close-down" of uric acid, urea and creatinin, in the order named. In this instance, the creatinin output remains unaffected.

In the meantime, with all this knowledge in front of us, and with all the effort which had been made to reduce symptoms, what had happened to the patient? She was sent to bed, and this diet, low in sodium chlorid, sugar-free, low in nitrogen, and the starch concentration of which was low, was started. The glucose-fat ratio after the formulae of Woodyatt was 1:1.5, thus utilizing all the calories that could be safely obtained

from fats. The total caloric value was 1400 daily. The total value of the caloric intake was 1400.

Within three days the patient passed an uninterrupted night's sleep, the first in months. Within a week, she was sleeping flat on an ordinary pillow, an experience which she had not enjoyed for two years. A disagreeable ventricular extra-systole disappeared and at the close of this period of observation, her blood pressure was 110/75 m.m.

The patient had been relieved symptomatically only. She has not been cured. Too much emphasis cannot be placed on this statement. The experience happens to be the best one of several. In every case so far, where a faithful attempt has been made along these lines, *some* good has been done. There have been some failures owing to the fact that the co-operation of the patients have been difficult to obtain.

I have listened with great interest to this paper by Dr. Ramirez and to my fellow practitioners who have participated in the discussion. It seems to me that there is a constant allusion to an unknown factor in the genesis of bronchial asthma, the factor "X". Can it be that this unknown factor to which constant references have been made here tonight, lies in the perverted body chemistry, occasioned by bacterial infections which are so characteristic of the condition? Can it be possible that this kind of perverted body chemistry will maintain an asthma once initiated by other etiological factors even after these factors are removed and that patients will not improve symptomatically until this perverted chemistry is corrected?

DR. B. E. LEATHERMAN (Toledo) said that Dr. Hazelton, of Chicago, was a personal friend and had been so for a year or more. He had been devoting a great deal of time to the study of bronchial asthma with some satisfactory results, others very unsatisfactory. Last February he had spent two weeks with Dr. Hazelton, in his office. A few months before that Dr. Hazelton and one of his associates had come to Toledo and given his conception of bronchial asthma, and the idea was so revolutionary that it attracted great attention. Dr. Leatherman said he was familiar with Dr. Hazelton's theory, and those who had read his articles would remember that he did not believe that every nasal trouble or nose caused bronchial asthma; he said that every case of bronchial asthma has some kind of nasal trouble; they have a lot of other things very often, but that most have some kind of nasal trouble, and he chooses to call it an empyema. He claims that asthma is a toxic condition, a toxemia, a chronic sepsis, and that most cases have in addition an ethmoiditis, else they will not have bronchial asthma; they may be sick otherwise. He says that it is brought about by the trifacial nerve to the brain and possibly the trigeminal, etc., etc. He brings out very emphatically that the nose may be only one factor, and may be a very important factor. The ethmoidal area, including the middle turbinate, furnishes the sensitive zone, the trigger that brings about the explosion, and the ethmoid may also furnish the source of the infection. The patient may have an ethmoiditis that brings about the chronic sepsis; but, on the other hand, the chronic sepsis may be caused by a gall bladder condition, bad teeth, a chronic appendicitis, etc. He lays great stress on the fact that it may be in the intestine. He says that the treatment of asthma is a two-man job; no one man can successfully treat a large number of asthmatics; it needs a competent internist and a competent rhinologist.

Dr. Leatherman said that he studied with Dr. Hazelton for two weeks, and saw a number of asthmatics from different parts of the country, and as far as could be seen he was getting the results claimed. He himself had not gotten such good results, but Dr. Hazelton said that it was because he had not been able to secure the aid of a good internist, that the patient must be relieved of everything that was wrong, every sort of infection, and in addition must have proper ethmoidal treatment. He had a kind of treatment that most regular physicians never heard of. Dr. Hazelton is a homeopath, and most regular physicians read very few

homeopathic journals. He says that successful treatment does not mean operation alone, but also the application of the treatment, prolonged in most cases. This treatment was devised by Dr. Dowling, of Albany, and is a very remarkable one. Since Dr. Hazelton has been writing about this treatment, many have tried it, and many have condemned it. Dr. Leatherman said that he had not himself used it as it is really recommended and condemned. Of course if anyone saturates a piece of cotton with argyrol and pushes it up the nose he is not likely to get good results, but that is not the Dowling treatment. Likewise, in the application of the Dowling treatment to the nose, you have to have someone show you how to do it. The internist must make a very careful study of the patient and find out everything he can that is wrong.

One of the most striking cases Dr. Leatherman had seen was the treatment of a medical man who had been forced to give up his practice for a number of years. The first thing in his treatment was the removal of his gall bladder. They hospitalize every case, and claim to have gotten 100 per cent results, but they select their cases very carefully. They claim that the main thing that regulates the selection of their cases is whether the patient is able or in position to take the treatment; and they will not take a case unless the patient will go into the hospital and stay there long enough to take the treatment thoroughly; they will not take anyone under any circumstances who will not convince them beforehand that he can take the treatment, and they have him pay beforehand as a guarantee that he will do so. They say that asthma is a rich man's disease. They turned down no one because it was a bad case, but they all had to have the money, for often the patient was in the hospital for two or three months.

Dr. Leatherman said he was convinced that Dr. Hazelton had something which he himself had not been able to work out as yet, but that he was going back to Chicago and get further information and see what he could learn, and if the results have been continued.

Dr. A. C. Howe said that he had been interested in the study and treatment of asthma as a rhinologist since Goodale, of Boston, published his work some fifteen years ago, and had been unable to convince himself that there is very much asthma that is not protein or allergic in nature. He had been much interested in the paper just read, for it showed a study of asthma that is rarely given to this subject. The classification was somewhat confusing, for Dr. Howe believed all asthma is allergic and would classify all cases as follows: bacterial asthma; inhalatory asthma; and food asthma. All of these cases will practically react to dermal tests in one of these lines and will respond to treatment along that line.

Many cases are classified as asthma that are not asthma, but are really bronchitis or dysnopia, perhaps of cardiovascular origin. It is absurd to think of treating every case of asthma as of bacterial origin.

In going over all cases treated in the past four years 50 per cent were of inhalatory origin; 35 per cent of bacterial origin; and the rest of food origin—so that it is unreasonable to treat every case of asthma from a rhinological standpoint. It is not logical to treat a case of asthma surgically, regardless of the condition of the nose, when it is due to the inhalation of some protein; and especially when 50 per cent of the cases that come under observation are of inhalatory origin. The bacteriological cases, which are particularly the rhinological cases, were found to be about 35 per cent; these are the cases that respond to intranasal treatment and to injections of bacterial proteins. Practically all of these cases, or a large percentage of them, responded to protein tests, and where very pronounced dermal reactions were secured, it was found that the cases responded at once both to intranasal operation and also to the injection of bacterial vaccine or toxins.

Dr. Howe said he did not believe in the condition of sympathetic-clonia in any type of asthma, and that he wished to reinforce what the reader of the paper and other speakers had said in regard to the need for radical intranasal work. He had never seen a case of asthma improved by ton-

silectomy or by the removal of teeth. They had found that a large majority of the cases were due to infection of the sphenoids and posterior ethmoidal cells, rather than to the anterior cells; that the rest were due to involvement of the antra.

The treatment by operation for asthma must be very radical; there must be complete exenteration and the widest possible drainage and ventilation of the larger antra. Some ten years ago he had treated a case of asthma that had impaction of the middle turbinate against the septum. The patient was a woman who had suffered from asthma for forty years. The asthma vanished over night after the anterior tip of the turbinal was removed. He had seen case after case relapse when the sphenoid closed; but the symptoms vanished as soon as drainage was re-established and remained away so long as the sphenoid remained open. A large amount of pus in a parasinus is not necessary to cause asthma nor does it require a large amount of absorption of infected material, as the absorption from a limited area in one of the larger sinuses is sufficient to precipitate an attack of asthma.

Dr. Howe said they combined the injection of vaccines and toxins with all the intranasal work, and the results had been most satisfactory. As to the permanency of the result of the immunization, they had patients who had retained their immunity for eight or nine years, apparently permanently immunized. As to the injection of animal proteins, patients subjected to that treatment had remained immune for four or five years; so that there was reason to hope that this protective immunity would remain permanent. But when the ashma was of bacterial origin, the immunity would last only till the next severe reinfection, when a few injections would usually relieve the attack; long periods of freedom from symptoms have frequently been secured by bacterial injections alone.

Dr. Wolff Freudenthal said that Dr. Ramirez had given an excellent idea of his views on asthma from his large experience. He had stated that 25 per cent of the cases are of a specific nature, and the rest he liked to call nonspecific. Dr. Freudenthal said that he had handled the nonspecific cases. Among those 75 per cent of the cases he sees, there is always a focus somewhere in the system, *plus* something else. Dr. Faulkner had spoken of applying cocain to the sphenopalatine in one case and stopping the attack immediately. That was nothing unusual. Three years ago he had treated a case at the Montefiore Hospital in which the girl was cyanotic from bronchial asthma. She was known to be able to produce such attacks whenever she desired to do so. He had called up the house doctor and in a loud voice asked him for "the strongest injection of morphin". A few saline drops were injected and the asthma stopped immediately. These are exceptional cases because they are all of purely hysterical origin.

But one comes to the question: What is this attack, this spasm? Dr. Freudenthal said he did not call it a spasm of the bronchi, for he did not believe that a spasm could exist for two or three days, or a week, with only slight intermissions. He had made some experiments, and believes that one has here to do with a spasm of the dilator muscles and a secondary constriction. This is of importance because the sympathetic nerve is involved, and for that reason we see so often the beneficial effect of adrenalin in acute attacks.

What must the rhinologist do when such a case comes to him? Of course he must operate radically, if he does operate at all, but he should not always operate right away. Dr. Freudenthal said he has seen cases that developed asthma *after* nasal polypi had been removed. That was what he called traumatic asthma. He had once treated a patient for several weeks for polypi in the nose. The intestinal stasis was first relieved, and later the polypi were removed and the ethmoids were operated upon. If it is not intestinal stasis it is something else that causes the attacks. He had cured many patients by treating their rheumatic conditions exclusively.

DR. FREUDENTHAL said he could not subscribe to what had been said about Dr. Hazelton, for it was not the ethmoids alone that caused the trouble. It is sometimes the antrum or any other condition that produces the asthma. He had himself cured cases by removing the adenoids, but he had never seen a case cured by removing the tonsils or all the teeth! He subscribed to everything that Dr. Harris had said so well, with one exception: He has used this intrabronchial treatment frequently—not in every case, but in selected cases only. The treatment is sometimes difficult, as some of these patients will become cyanotic right away. In many selected cases it has done good, where other treatment had failed entirely.

DR. MARK J. GOTTLIEB said that the paper was one that contained a good deal boiled down into a few words, and what was said was undoubtedly the result of an experience based upon painstaking care and honest effort. He said that he agreed with everything that Dr. Ramirez stated, with the exception that he agrees wth Doctors Freudenthal and Howe in never having seen a patient recover from bronchial asthma as a result of the removal of the tonsils. Swain in a symposium on asthma at the Twenty-first Congress of the American Laryngological Society said that it was his opinion that for the production of asthma in an individual, there must be some constitutional quality in that person which would render him susceptible to an exciting cause. That is an unusual thing to find in the literature of that day, for it was not conceived until eleven or twelve years ago, that heredity is a fundamental characteristic in the individual which predisposes him to asthma.

It was gratifying to hear Dr. Faulkner speak about cocainization of Meckel's ganglion. Dr. Gottlieb said that he had tried this method, but had not been able, even with very strong solutions to obtain the prolonged effects that Dr. Sluder apparently gets.

What Dr. Faulkner said about the work done at St. Luke's Hospital was most interesting. He had heard Doctors Touart and Thomas with a lantern slide demonstration before a meeting of the New York County Medical Society. Goodale was the pioneer in that field, that is in testing for sensitization, by using autogenous suspensions of bacteria on the skin. Subsequent to that, Dr. Gootlieb himself had done some work on the intestinal flora, using intradermal suspensions of autogenous bacteria, and then came the work of Touart and Thomas. This has been very elaborate and portends that valuable information on this subject will eventually be obtained.

In the case if sinus disease as related to asthma, the rhinologist must necessarily take a deep interest. Dennis, in a recent article, on the relation of nasal accessory sinus disease to asthma, emphatically states that to obtain results, one must operate on all sinuses that are under suspicion. A small percentage of cases of asthma with diseased sinuses demonstrate pus. The majority were hyperplastic. The results which he reported were good. Lintz, however, emphatically states that nasal accessory sinus surgery in cases of asthma is useless and other methods should be tried.

Dr. Gottlieb said that he had gotten some good results from surgery on the paranasal sinuses, but on the other hand in some cases, the results were not satisfactory.

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Double Empyema of the Maxillary Sinuses. Dr. M. M. Cullom.

Dr. Cullom reported the case of a white male, age 18 months, who in 1916 was brought to him because of a unilateral purulent nasal discharge which had been present for some months. On account of the age of the patient a foreign body was suspected, but a careful search failed to reveal such. A bland oily spray was prescribed.

About eight years later the patient was again brought in by his parents, who stated that he had a bilateral profuse nasal discharge. The child's appearance was that of an under-developed boy, his color was bad, and his appetite poor. Examination revealed both nostrils filled with offensive pus and adherent crusts. The appearance was that of atrophic rhinitis. Transillumination showed both antra very dark. Drainage of the antra was advised. A large opening was made under each inferior turbinate, the atrophic condition of the turbinates rendering an anterior turbinotomy unnecessary. The operation was followed by irrigations. The crusts disappeared from the nose, the boy's color promptly returned, and he developed an enormous appetite. The washings at this time contain very little pus.

The point of great interest in this case is the appearance of well marked empyema of the maxillary sinuses at the age of 18 months and the development of a chronic empyema of both antra at that early age. It would be interesting to know how early the pus made its appearance in the antrum.

DISCUSSION.

DR. JERE W. CALDWELL: It has been my experience that where a sinus condition is associated with a great deal of adenoid tissue on the removal of the latter the sinus condition clears up. I have always attributed this to the fact that the sinus condition results from improper breathing and abnormal congestion of the turbinates, interfering with drainage. On establishing proper nasal respiration the turbinates subside and the empyema gets better.

DR. M. M. CULLOM (closing): I have been looking for sinusitis in children a great deal more recently than I did eight or nine years ago. At the time I first saw this child I was not prepared to expect antrum suppuration in an 18 months old baby. I have had a good many acute cases in children, which have cleared up under treatment, but chronic cases like this are rare. I think Dr. Sullivan's point, *i. e.*, that we are apt to overlook these conditions in children, is well taken.

Foreign Body in Bronchus. Dr. Herschel Ezell.

Dr. Ezell reported the case of G. M., a white male, age 22 months, who was brought to him Dec. 10, 1924. Three weeks previous to this time the child developed a cold and cough which failed to respond to treatment. His family physician was unable to make a definite diagnosis, but suggested the possibility of a foreign body in the wind pipe and advised that the child be taken to a throat specialist. For three days there had been considerable wheezing and rattling, with paroxysms of uncontrollable coughing, worse during the day. For a day or two the rattling in the throat had been practically constant. The mother stated that a neighbor had given the child a handful of cracked hickory nuts about the time the trouble developed.

On examination the patient's face was flushed and the rattling in the throat was loud and constant. No rales were heard in either lung. Direct examination with a laryngeal mirror failed on account of the child's extreme nervousness. An X-ray picture revealed no foreign body, but showed that the lungs were free of pneumonia. Examination of the chest showed some obstruction in the right lung. A tentative diagnosis of foreign body, probably a piece of hickory nut, in the right bronchus was made and a

bronchoscopic examination was advised and carried out, the large short tube of the Kohler-Leiter instrument being used. This failed to reveal a foreign body, although the interior of the larynx and the upper part of the treachea were plainly visible. Feeling sure of the presence of a foreign body it was advised that the patient be kept under observation.

Two days later another bronchoscopic examination was made, one of the smallest Jackson tubes being employed. A foreign body could be seen at times in the right bronchus. Every effort, however, to grasp it with forceps failed. After several unsuccessful attempts a tracheotomy was done and an effort made to introduce the bronchoscope through the tracheotomy wound. This failed because of the presence of bloody mucus which was blown into the bronchoscope. A tracheotomy tube was thereupon inserted and the patient put to bed.

The following day Dr. Hilliard Wood was called into consultation and advised another attempt at bronchoscopy. The presence of a great many rales mainly in the right lung, was reported; the patient's temperature was 104⅕.° With Dr. Wood's assistance another examination was made, one of the smallest Jackson tubes being employed. Again the foreign body was seen in the neighborhood of the bifurcation of the trachea and again several efforts to grasp it failed. It was not deemed wise to attempt further examination and the patient was put to bed. He grew gradually worse and expired about 3 p. m. of the same day, Dec. 13.

DISCUSSION.

DR. HILLIARD WOOD: This child was in extremis when I saw him. I looked as long as I felt there was any justification for looking. I was never able to see the foreign body, although Dr. Ezell did see it. It was so small it would drop out of sight. The smaller the piece, of course, the harder it is to see it and the harder it is to pick it up when you do see it. This is just one of those tragedies that sometimes occur in tube work.

Cavernous Sinus Thrombosis. Dr. Jere W. Caldwell.

Dr. Caldwell reported the case of a white male, age 43 years, who while endeavoring to remove some hair from the left nostril, cut the skin. An abscess formed, which he picked. The nose and lip began to swell and a typical erysipelas formed. He had pain in the involved area, with high temperature. He was apparently improving when about ten days following the accident he developed frontal pain and edema of the left eye. The swelling increased, causing marked edema of the lids and the conjunctiva. The pain was so severe as to require an opiate for relief.

Examination Dec. 4, 1924, showed the following condition:

O. D. Slight edema of the upper lid.

O. S. Vision blurred. Patient stated that he could not see the light of the ophthalmoscope. Marked edema of the lids and conjunctiva. Skin in that area tender. On dilatation of the pupil the fundus showed tortuous veins and constricted arteries.

The temperature was typically septic.

A tentative diagnosis of cavernous sinus thrombosis was made.

The following day the edema in both sides increased. The patient was in a semicomatose condition, his temperature ranging from slightly above normal to 104.° Dr. Cayce was called into consultation and confirmed the above diagnosis. The patient died on the morning of Dec. 6.

DISCUSSION.

DR. M. M. CULLOM: Some years ago I saw a case which had been diagnosed as cavernous sinus thrombosis and which subsequently proved to be erysipelas.

DR. FRED HASTY: The interesting thing in this case is the rapidity with which the swelling developed in the second eye after it was noticed in the first eye. The case is plain on the surface. The swelling in the first eye arouses suspicion and then by watching the second eye the diagnosis is confirmed. I think Dr. Kennon's point, also, is well taken. Another interesting thing is the amount of edema developing in the upper lids.

DR. CALDWELL (closing): One thing in this case that established the diagnosis was the appearance of the eye grounds, *i. e.*, pressure on the nerve head, giving enlarged veins and some edema.